PPW Report 2003-03

PARTNERSHIP FOR PUBLICWARNING

The Emergency Alert System (EAS): An Assessment

Partnership for Public Warning

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PARTNERSHIP FOR PUBLIC WARNING

The PPW Vision - Every person will have the information needed in an emergency to save lives, prevent injury, mitigate property loss, and minimize the time needed to return to a normal life.

The Partnership for Public Warning is a unique, not-for-profit partnership between the private sector, non-profit community, government and academia.

The mission of the Partnership for Public Warning is to save the lives and property of people at risk from natural disasters, accidents and terrorism by improving the nation's alert and warning capabilities. PPW is working to accomplish this mission by providing an objective, consensus-based forum where all interested stakeholders – both public and private – are working together to develop processes, standards, systems and strategies to ensure that the right people have the right information at the right time.

PPW's specific objectives include, but are not limited to:

- Fostering communication and cooperation among the various government entities (local, state and federal), private organizations and public interest groups engaged in public warning activities.
- Providing an objective, consensus-based forum where interested stakeholders can work together on procedures, policies, standards, systems and other key public alert and warning issues.
- Promoting and conducting research and studies into key warning issues.
- Educating, assisting and advising emergency managers and government officials on the development, implementation and operation of public warning systems, technologies, policies and procedures.
- Supporting the timely generation of standards, specifications, and protocols necessary to enhance the effectiveness of public warning systems.
- Encouraging private sector investment in the development of new warning technologies and promoting the existence of such technologies to the appropriate decision makers in government and industry.
- Fostering a knowledgeable public and informed decision making by establishing, maintaining and providing educational materials and other information on warning technologies and programs.

Membership in the Partnership for Public Warning is open to any organization or individual who is interested in public alert and warning and shares our vision. Voting membership in the Partnership is available to local, state and government entities and to private organizations (for-profit and not-for-profit). Individuals may join the Partnership as

non-voting, associate members.

The Partnership for Public Warning is a 501(c)3 organization and all dues and other payments are charitable tax contributions to the extent otherwise permitted by law.

For more information on the Partnership and to learn how you can get involved, visit the PPW web site at www.PartnershipforPublicWarning.org. The Partnership may also be contacted by writing or calling:

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Background on this Report

The Emergency Alert System is one of two national systems that exist in the United States to provide alert and warning information directly to the public. The other system is the Weather Radio System operated by the National Oceanic and Atmospheric Administration's National Weather Service.

The purpose of this document is to provide a definitive description and evaluation of the EAS past and present as a basis for recommending ways to make immediate improvements. . As this report indicates, the current Emergency Alert System has a number of significant policy, management and operational challenges.

America has an obligation and the technologies to build a national alert and warning system that can warn people regardless of where they are, the time of day or the language they speak. In May 2003 the Partnership for Public Warning issued "A National Strategy for Integrated Public Warning Policy and Capability." This document, which was developed with input from experts in both industry and government, sets forth a vision and strategic plan for creating a more effective national public warning capability. This report may be obtained from the PPW web site at www.PartnershipforPublicWarning.org.

Special thanks go to Frank Lucia for contributing his leadership and expertise to the production of this report.

The Emergency Alert System (EAS)
An Assessment

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Executive Summary

This document is an overview of the Emergency Alert System (EAS). It includes:

- A comprehensive history beginning with the creation of CONELRAD in 1951.
- An assessment of the present status of the system.

Established in 1994, EAS is our primary national warning system. It has two functions:

- It provides a method for the President to address the nation during dire national crises.
- When not in use by the President, state and local officials can use it to issue short warning messages of imminent or ongoing hazards through broadcast stations and cable systems in specific regions.

Presently, all radio and television stations and cable systems are required to install, maintain and test EAS equipment so that they can receive and transmit national (Presidential) EAS messages. National EAS alerts are issued through the Primary Entry Point (PEP) system via dialup telephone lines to 34 radio stations/locations that reach approximately 90% of the continental U.S., plus Hawaii, Alaska and Puerto Rico. Through a predetermined monitoring structure specified in state and local EAS plans, all other broadcast stations and cable systems should be able to receive the EAS Presidential message for dissemination to their audiences. Broadcasters and cable operators have an option under the current EAS regulations to relay or not to relay EAS state and local alerts. Also, they can postpone relaying un-expired alerts until a natural pause in programming. Once the President issues an EAS national message, there is no relay delay under the operational requirements for FCC certified EAS equipment.

State and local alerts consist of weather and non-weather warnings and now include qualified AMBER alerts. No figures are available as to how many of the 14,000+ broadcast stations and 10,000+ cable systems issue state and local alerts but estimates suggest about 50%. Local alerts can also be input into the EAS by the National Weather Service (NWS), which originates about 80% of all EAS alerts. In some localities, emergency managers can input alerts through NWS, or through requests to a broadcaster or cable operator, or by using their own EAS equipment provided they have made prior arrangements with the participants as specified in EAS state and local plans.

Since 1976, the predecessor of EAS, the Emergency Broadcast System (EBS), operated under a Memorandum of Understanding (MOU) between the FCC; the Defense Civil Preparedness Agency, now an element in FEMA; NWS; and the FCC's National Industry Advisory Committee (NIAC). The MOU defined a framework for a cooperative effort for developing and evaluating effective EBS plans and related capabilities at the state and local levels of EBS operations. The MOU was last updated as an Agreement in 1981. It has not been updated to reflect the capabilities of the new EAS. Presently, successful operation of EAS depends on the following committees of volunteers:

- The Primary Entry Point Advisory Committee (PEPAC) convened by FEMA.
- State Emergency Communications Committees (SECCs).
- Local Emergency Communications Committees (LECCs).
- EAS Committees of the Society of Broadcast Engineers (SBE) and the Society of Cable Telecommunications Engineers (SCTE) and by numerous local chapter activities of these two groups.

For EAS to operate effectively at the state and local levels, an EAS plan is required that specifies when and how the EAS may be activated. Support for developing and maintaining state and local EAS plans has decreased over the years. Furthermore, many consider EAS to be an unfunded Federal government mandate, with the FCC focusing on enforcement of EAS regulations. Therefore the system is quite inhomogeneous and prone to failure unless the plans are finalized, up-to-date and regularly tested. There are three main concerns that are preventing EAS from becoming a truly effective warning system and therefore depriving the nation from having a unified warning system:

The PEP system cannot be monitored reliably by all of the entry points for the state level EAS networks. Also, the major networks, national cable program suppliers and other national networks are not part of the national level EAS.

Government leadership and support has diminished. No one government agency is in charge of the system. Areas of concern include outdated EAS plans, missing communication links, and lack of training and equipment for emergency managers.

There is no concerted government/industry effort that combines EAS and other alerting techniques with existing and new technologies to form a combined warning system. In addition to radio, television and cable, people now have wired and wireless Internet, cell phones, pagers, etc.

Introduction

The Emergency Alert System (EAS) is our primary national warning system. It serves two functions:

- It provides a method for the President to address the nation during dire national crises.

- When not in use by the President, state and local officials can use it to issue short warning messages of imminent or ongoing hazards through broadcast stations and cable systems in specific regions.

All radio and television stations and cable television systems must broadcast Presidential alerts immediately or leave the air. They may choose to broadcast state and local alerts and can postpone broadcasting a given warning or alert that is still in force until there is a programming pause. National alerts are issued through the Primary Entry Point (PEP) system via dialup telephone lines to 34 continental US and territorial radio stations. These 34 PEP stations cover in theory approximately 90% of the U.S.

All non-PEP 14,000+ broadcast stations and 10,000+ cable systems are required to follow their EAS state plans. Each state's plans specify the monitoring assignments for all broadcast stations and cable systems within that state. At least one PEP station should be monitored by a state's EAS network so that national level EAS messages can be distributed in that state. All broadcast stations and cable systems have EAS designations that describe their function within EAS. PEP stations have a National Primary (NP) EAS designation since they are the entry point for national level EAS messages. State level entry points have designations of State Primary (SP) and State Relay (SR). Local entry points have designations of Local Primary (LP). There is one national network that has voluntarily agreed to distribute national level messages to its affiliates. National Public Radio (NPR) directly monitors a PEP/NP station and will relay a national level EAS message as soon as it is received. To reduce the likelihood of a single point of failure preventing an EAS message from getting through, FCC regulations require all broadcast stations and cable systems to monitor at least two EAS sources that are specified in their EAS state plan.

The National Weather Service (NWS) originates about 80% of all EAS alerts. Some broadcast stations and cable systems voluntarily monitor the National Weather Service's NOAA Weather Radio (NWR). NWR supplies local EAS encoded alerts to broadcast and cable entry points as set out in each approved EAS state and local plan. In some localities, emergency managers can originate EAS alerts through NWS, through a broadcaster or cable operator, or through their own equipment if they have made prior arrangements that are documented in EAS plans. Proper operation of the EAS depends on those state and local plans that specify how stations are linked together in monitoring webs; how SP, SR and LP EAS sources get EAS warnings; how EAS testing is accomplished; and which EAS messages may be relayed.

History of the EAS

The EAS and its predecessors evolved out of a Cold War need to warn the American public in the event of a nuclear attack. It has been in various forms a concern of every Presidential administration since 1951.

In 1951, President Harry Truman established CONELRAD (CONtrol of ELectromagnetic RADiation). CONELRAD required most broadcast stations to go off the air during a national emergency. It was designed to prevent an enemy from using AM broadcast transmitters as homing beacons for bomber or missile attacks. The stations designated to remain on the air switched their transmitting frequencies to either 640 or 1240 kilohertz and operated in rotation to fool existing state-of-the-art airborne direction finding equipment. A White House Statement of Requirements (WHSR) for CONELRAD was issued in 1952. CONELRAD became operational in 1953 when the President participated in its nationwide testing. All radio and television networks were enlisted to relay Presidential messages to CONELRAD participants.

In 1958, the Federal Communications Commission (FCC) established the National Industry Advisory Committee (NIAC) consisting of volunteer industry personnel who provided expert advice to the FCC concerning emergency plans, rules, policies, etc.

In 1960, an updated WHSR was signed by President Eisenhower. It was further updated and signed in 1962 by Press Secretary Pierre Salinger on behalf of President Kennedy.

By 1963, the accuracy of missile and bomber guidance systems made CONELRAD obsolete. However, President Kennedy wanted a last ditch capability to address the nation on short notice during a national emergency. The Emergency Broadcast System (EBS) was developed to meet this need. It allowed participating broadcast stations to remain on the air on their own channels, and retained the CONELRAD network distribution system to get Presidential messages to each participating station. EBS retained a CONELRAD signaling technique that required broadcasters to turn their transmitters off and on in a scheduled pattern to activate special EBS receivers. The FCC issued EBS regulations in Title 57 Code of Federal Regulations (CFR) Part 73. This formalized the use of the major broadcast networks to transmit national (Presidential) EBS messages to participating stations.

At the same time, the Broadcast Station Protection Program (BSPP) was established as a complement to EBS to support the core elements of the EBS infrastructure. The intent of the BSPP was to try to ensure that high power AM stations with wide coverage areas would be on the air after a nuclear attack. The Office of Civil Defense (OCD), in cooperation with the Army Corp of Engineers, funded the BSPP. It was designed as a national program to protect broadcast facilities deemed necessary by OCD to transmit a national level (Presidential) EBS message. Under the BSPP, selected stations were provided with an emergency generator, fuel tank, programming equipment, fallout shelter, and two-way radios to link the broadcast station with their local Emergency Operating Center (EOC). The fallout shelter became the property of the station and the equipment became the property of the FCC. The equipment

was made available to each station under an Equipment Loan Agreement (ELA) between the FCC and the station licensee. Some stations also received hardware for Electromagnetic Pulse (EMP) protection.

In 1966, the WHSR was updated by President Johnson and in 1969 by President Nixon.

On February 21, 1971, at the time of a regularly scheduled test, the National Warning Center at the North American Air Defense Command (NORAD) in Colorado transmitted an Emergency Action Notification (EAN) message, instead of the scheduled test message. The EAN message was supposed to be issued to the industry network control points only when the President has activated the national level EBS. The EAN message was sent over the AP and UPI wire services, which were for EBS purposes under NORAD's control. Many broadcast stations did not immediately respond to the EAN message as required by the FCC EBS rules. An extensive study of the event was done and a detailed report was issued. Some stations reported that they thought the message was a mistake because it was issued at the same time as the routine NORAD weekly wire service test message. Others searched for confirmation from other sources such as the major networks but could find none. Some stations simply failed to hear the wire service alarm or see the printed wire copy message. Some stations actually aired the message.

In 1972, the government, in cooperation with the National Industry Advisory Committee (NIAC), corrected deficiencies they found as a result of the NORAD error. Their corrective actions were to:

- Remove the "Attack Warning" function from EBS. This action removed NORAD as an activator of the national level EBS. Only the President could now activate the national level EBS.

- Revise and simplify the EBS instructions issued by the FCC such as the Part 73 EBS rules, EBS Checklists, EBS National Control Procedures, Authenticator Lists, etc.

- Improve the activation and authentication procedures.

In 1976, the FCC replaced the old CONELRAD inter-station alerting technique with a two-tone EBS Attention Signal. NIAC had been testing the new two-tone signal extensively for years and recommended that the FCC implement it. The two-tone signal improved the technical performance and reliability of inter-station message relay for EBS since it did not require broadcast transmitters to be turned off and on as did the CONELRAD technique. It also permitted the production of inexpensive home radios with EBS alerting circuitry. The unique attention signal made it possible to un-mute radios tuned to participating stations. The FCC amended its EBS regulations in Part 73 to permit use of the new signal. All FCC EBS instructions were amended to reflect use of the two-tone Attention Signal.

Also in 1976, the Defense Civil Preparedness Agency (DCPA), a part of the Department of Defense; the FCC; the National Weather Service (NWS), a part of the Department of

Commerce National Oceanic and Atmospheric Administration (NOAA); and the NIAC signed a Memorandum of Understanding (MOU) to promote a coordinated effort to develop detailed state and local plans to permit use of EBS for warning the public about local disasters. Until this time, EBS was rarely used by state or local authorities for natural or man-made disasters. Some local areas had devised their own warning networks, and their successes were seen as ways to increase the utility of the EBS. The FCC, FEMA and NWS partnered to give assistance in many forms in the states and territories to broadcasters and state and local officials in their EBS planning. These three federal entities worked with state and local emergency management to provide training materials and host a series of meetings across the nation. Also, a guide to implement the agreement was written entitled "Plan for Nationwide Use of the Emergency Broadcast System for State and Local Emergencies."

In 1979, President Carter signed an updated WHSR.

In 1981, the 1976 MOU to develop state and local plans was updated as an Agreement (Appendix I). DCPA was now part of the newly formed FEMA, and new administrators were in place at the agencies. The planning effort had made tremendous progress as every state and territory and more than 400 localities completed EBS plans.

In 1982, President Reagan signed an updated WHSR and the FCC reorganized the NIAC to include new Working Groups.

In 1983, the FCC and FEMA began studies to develop new national level "Last Resort" EBS procedures. The national level EBS consisted of dedicated circuits from the Federal government to each of the major radio and television networks. FEMA funded the circuits and equipment located at the major network control points. The networks then distributed national level EBS messages to their affiliates via their own facilities. AT&T provided a "Last Resort" capability in the event of the failure of the dedicated circuits because AT&T controlled the nation's telecommunications infrastructure. Under the existing "Last Resort" procedures, the Federal government would contact key AT&T program control centers to patch national level EBS messages to the networks for distribution.

But, the breakup of AT&T jeopardized this plan since AT&T would no longer be in total control of reconfiguring the telecommunications infrastructure and the number of AT&T program control centers was being reduced. To compound the challenge, the broadcast networks began to bypass AT&T and use their own leased satellite facilities for program distribution. Any new "Last Resort" procedures would need to bypass the AT&T program control centers and the major network control points, most of which were located in high risk areas. And, new "Last Resort" procedures would likely have to provide communications links from the Federal government directly to selected broadcast station transmitters at some distance from the intense overpressures predicted for nuclear detonations in high-risk areas. However, funding to implement the new "Last Resort" procedures was not available until the late 1980s.

In 1984, Executive Order 12472 reaffirmed EBS operational responsibilities. The Order instructed FEMA to "develop, upon request and to the extent consistent with law and in

consonance with regulations promulgated by and agreements with the Federal Communications Commission, plans and capabilities for, and provide policy and management oversight of, the Emergency Broadcast System, and advise and assist private radio licensees of the Commission in developing emergency communications plans, procedures and capabilities." Also, the Federal Communications Commission would, "Review the policies, plans and procedures of all entities licensed or regulated by the Commission that are developed to provide national security or emergency preparedness communications services, in order to ensure that such policies, plans and procedures are consistent with the public interest, convenience and necessity."

In 1986, the national level EBS dedicated circuit network was upgraded and renamed the EAN (Emergency Activation Notification) Network. The network upgrade included new equipment and new EBS National Control Procedures. Also, the FCC dissolved NIAC and replaced it with two new committees: the National Security and Emergency Preparedness Advisory Committee (NSEPAC) and the Emergency Broadcast System Advisory Committee (EBSAC).

In 1987, a special EBS Working Group, established by the FCC Executive Director to include participation from FEMA, NWS and the National Telecommunications and Information Administration (NTIA), released a report concerning the survivability of the national level EBS during and after a nuclear attack. One of the conclusions of the report emphasized that national on-air tests needed to be performed to insure that the national system worked from end to end. However, this conclusion was never implemented. Also, FEMA began funding the "Last Resort" procedures developed in 1983 to backup the EAN Network. The "Last Resort" procedures became the Primary Entry Point (PEP) system. Goals of the PEP were to increase the survivability of 30 selected continental U.S. and 4 territorial broadcast stations with equipment under the BSPP and provide secure communication links to these stations from the designated Federal government-warning center.

During the 1980s, NWS began investigating a new signaling technique to replace the single tone signal used by NOAA Weather Radio (NWR). When transmitted on NWR, the single tone signal would turn on all NWR consumer receivers within range of an NWR transmitter. An audio message following the tone alerted the consumer to a weather announcement. This signaling technique alerted more people than might be necessary. NWS wanted to have a system that would target specific messages to a specific area. NWS studies resulted in the development of a digital coding system called, "Specific Area Message Encoding" (SAME) or Weather Radio SAME or WR-SAME. WR-SAME specified that a digitally coded signal be transmitted before the single tone signal. The digital signal contained codes for the type of weather event, the location(s) and the valid time period of the message. A special NWR consumer receiver could be programmed to respond to messages by the type of event and location. NWS would begin to deploy WR-SAME in the early 1990s.

As early as the mid 1980s, it was becoming apparent to some broadcast engineers that EBS equipment and procedures did not lend themselves to automated operation or expeditious dissemination of emergency information. Pending future FCC approval, some broadcasters were already thinking about operating their stations as unattended facilities at certain times,

especially during the overnight hours. However, broadcasters found it difficult to operate EBS equipment in the automatic mode primarily because of the lack of an end-of-message signal. EBS transmissions consisted of the EBS two-tone signal followed by an audio message. The audio message contained information that had to be received and acted upon by an operator. The other option that was not thought to be a good solution was to automatically re-transmit all received EBS messages.

The basic idea behind any upgrade to EBS was to develop a way to speed up the delivery of emergency messages. Broadcast engineers wanted to avoid the delay associated with the process of listening and repeating emergency messages. Society of Broadcast Engineers (SBE) members in the mid-west began experimenting with various signaling schemes. In Colorado, demonstrations of frequency shifted Digital Tone Multi Frequency (DTMF) were presented at various SBE-sponsored events. These added some security to the signaling techniques. Other ideas included being able to scan several sources of information looking for the shifted DTMF header, keeping costs low, and using background, i.e. non-broadcast, channels and levels of alert to inform news departments on off-line channels. In the early 1990s, trade journals published article concerning these efforts.

In 1990, President Bush signed an updated WHSR and released a one-minute video statement praising industry participation in EBS. The message was part of a video training tape for broadcast station operators that was voluntarily produced by Durham Life Broadcasting in Raleigh, North Carolina.

In 1991, the FCC approved a Notice of Inquiry seeking technological improvements to EBS; and a Rule Making/Inquiry to shorten the length of the EBS two-tone signal, prohibit false EBS signals, improve broadcast station remote control operation, and revise the weekly EBS test script.

In 1992, FEMA further upgraded the EAN Network dedicated circuitry and equipment and began testing the communications links to the PEP stations. The FCC approved a Further Rule Making to improve the EBS structure, including equipment and operations.

In the early 1990s, many broadcasters began serious planning to operate their stations as unattended facilities. Also at this time, the Cable Act of 1992 required standards to ensure that cable systems provide emergency information to their subscribers. The Act read in part, “Each cable operator shall comply with such standards as the Commission shall prescribe to ensure that viewers of video programming on cable systems are afforded the same emergency information as is afforded by the emergency broadcasting system pursuant to Commission regulations.” But, it was not practical to install EBS equipment at cable head ends that were mostly unattended. So the FCC issued a Notice of Inquiry looking for methods to improve EBS and a Notice of Proposed Rule Making to revise certain EBS requirements. All of these events led the FCC to consider replacing EBS with a new alerting system.

In December 1992, the Commission invited manufacturers to demonstrate their proposed solutions to alert the public. Several companies participated and showed different approaches. SBE filed Comments and Reply Comments in response to all of the FCC EAS Notices.

The demonstration was followed by field tests in 1993 determine the feasibility of new alerting techniques under real operating conditions. Some of the goals of these tests were to examine the ability of broadcast, cable, satellite and other means to transmit digital information; to test speed, redundancy and reliability factors; and to determine operator needs for equipment responsiveness. During this exploratory time, the government received a great deal of volunteer assistance and free use of private facilities. Help came from broadcasters, cable operators, individuals and equipment manufacturers, state telecommunications experts, emergency managers, state broadcaster associations and the SBE. Many of the individuals who participated were volunteer members of the FCC's Emergency Broadcast System Advisory Committee (EBSAC).

The FCC later wrote in its 1994 Report and Order that,

> " The Western Field Test was conducted June 27 through June 30, 1993, in Denver. More than 75 representatives from broadcast stations, cable systems, satellite companies, emergency management offices, consulting engineering firms, amateur radio organizations, and manufacturers of alerting equipment and consumer end products, voluntarily provided their own personnel and resources for the tests. In-band, sub-carrier, satellite, HF radio, VHF, UHF, microwave, and telephone were the primary transmission modes tested. More than 35 devices were demonstrated during the tests. Three focus groups and one composite focus group offered some insight into audience perception of the systems and equipment".
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> "The Eastern Field Test was conducted September 12, 1993, through September 15, 1993, in Baltimore. The tests involved more than 60 representatives from government, industry, and manufacturing. Technical/emergency management personnel and others served as official observers to record the test results. Testing sites included the State Emergency Operation Center, experimentally licensed AM and FM stations, 25 FCC field facilities, the National Weather Service office, a cable head-end, existing AM and FM stations, and Spanish language television and radio stations".
>
> "The goals of both tests were to examine the ability of broadcast, cable, satellite, and other means to transmit digital information; to test speed, redundancy and reliability factors; to determine operator needs for equipment responsiveness; to test as many of the parameters in the Notice of Proposed Rule Making/Further Notice of Proposed Rule Making in different situations as feasible; and to experiment with an architecture broad enough to encompass other technologies as they become available. In response to the field-testing, we (FCC) received 42 Comments and 9 Reply Comments. The test data demonstrated that (1) monitoring of multiple sources of emergency information was successful in providing reliability and redundancy; (2) a small geographic area could be alerted without

> affecting other areas; (3) transmissions could be easily relayed from point-to-point via different transmission means; (4) equipment could automatically receive, store, and forward alerts and messages; (5) in-band and sub-carrier transmissions could co-exist; (6) satellite and cable technology could interface with the EAS digital transmission scheme; (7) mobile reception of in-band and sub-carrier were equally susceptible to multi-path, distortion, shadowing, and other propagation anomalies; and (8) consumer radio receiver equipment could turn itself on from an "off" position in response to broadcasters' digital signals, such as Radio Broadcast Data System (RDBS) signals."

The FCC further stated, "we adopt new rules for the establishment of an Emergency Alert System that is designed with a flexible architecture to accommodate current and future technologies and that will deliver instantaneous emergency information to the public. The new system will emphasize speed, reliability, and efficiency".

The FCC received hundreds of comments concerning what technology to adopt to replace EBS. Some even suggested that each state should be allowed to develop its own system. Most recommended a single standard specified in federal government regulations because; (1) interstate areas could not support multiple systems; (2) one nationwide standard would allow manufacturers to mass-produce lower cost hardware; and (3) broadcast station and cable system personnel would have to learn the procedures for only one system regardless of where they were employed. Some technologies possessed characteristics that had certain advantages and disadvantages over the technology adopted. And of course there were policy and promotional issues in the mix. The FCC 1994 Report and Order that established EAS was supportive of a number of alternate technologies but the final standard was the NWS SAME protocol with additional code elements. The FCC encouraged the use of alternate technologies in support of EAS. Some states have adopted such technologies as specified in their State EAS plan. Some close to the EAS standards process felt that politics significantly influenced the proceedings. Future standards processes should strive to keep undue political influence at bay and ensure that the best warning technology is selected.

On November 10, 1994, the FCC adopted a Report and Order that formally established the Emergency Alert System (EAS) to replace EBS. The EBS rules in Part 73 were replaced by EAS rules in a new Part 11. Local cable systems were included in EAS. EAS included:

1. Any transmission means could be used to send and receive EAS alerts and tests including satellite, telephone, radio, pagers, etc.

2. EAS messages could be formatted for specific events and locations.

3. The old EBS designations for key broadcast stations were replaced with new EAS designations; i.e. EAS Local Primary (LP) replaced EBS Common Program Control Station (CPCS).

4. The EAS digital signal could be used to display visual messages on devices with view

screens.

5. The EAS digital signal could be interfaced with computers and other digital devices.

6. The EAS digital signal time stamp code would prevent the transmission of outdated or duplicate messages.

7. EAS equipment would have to be able to monitor at least two sources for EAS messages. Eventually, almost all EAS equipment would be able to monitor up to six sources.

8. EAS equipment can store two minutes of audio message for later retrieval automatically. National levels messages are not limited to the two minutes.

9. National levels messages would not use the EAS "Store and Forward" model. If an EAS device were captured by a national level EAS code, the audio message would not be limited to two minutes and would only terminate on receipt of a national End Of Message (EOM) code.

10. The EBS weekly test would be replaced by two new EAS tests: a weekly test of the digital signal (Required Weekly Test - RWT) and a monthly test (Required Monthly Test - RMT). The RMT would include an audio message that could be developed by state and local officials.

11. All incoming EAS messages would be visually displayed on the EAS equipment at broadcast stations and cable systems.

12. The EAS digital signal could be used on any FM or TV sub-carrier signals.

13. The EAS digital signal would be identical to the NWS WR-SAME signal, therefore, EAS equipment would have to be capable of decoding NWS NOAA Weather Radio (NWR) SAME digital signals.

14. EAS equipment could be operated in either the manual, semi-automatic or automatic mode.

15. The old EBS two-tone signal would be transmitted after the EAS digital signal and before the audio message. This would allow legacy EBS two-tone alert decoders to still function and maintain an alerting capability to consumers, schools, hospitals, and other critical warning recipients with such equipment. It would also serve as an audio alert signal before the audio message.

16. After the audio message, an End-Of-Message (EOM) code would be used to reset the equipment. This EOM code can be used as a signal to return broadcast stations and cable systems to normal programming automatically.

Between the years of 1994, when the FCC established EAS, and 1997, when broadcast stations had to install and operate EAS equipment, an effort was made to update the State EBS plans bearing in mind the new features that would be available with the new EAS equipment. Workshops were held in several states, with the cooperation of the SECCs, LECCs, the SBE, SCTE, NAB, and state broadcaster associations. Also during this time, equipment manufacturers were developing prototype EAS equipment for certification by the FCC Laboratory. By the time of the 1997 EAS equipment installation deadline, the manufacturers had stockpiled enough equipment to meet the needs of the 14,000+ broadcast stations. One year later, large cable systems with 10,000 or more subscribers had to have EAS equipment installed along with switching equipment to provide EAS messages on all program channels. By October 2002, all cable systems and wireless cable systems had to meet this requirement.

In 1995, President Clinton signed an updated WHSR. On October 30, 1995, FEMA informed the FCC that the White House had determined that the President's daily access to the media is considered very reliable under all but the most severe conditions and that the Primary Entry Point (PEP) system will serve as the cornerstone for the new national level EAS replacing the EAN Network. The EAN Network was disconnected and the national networks were removed from the national level EAS. Also, the FCC amended Part 11 by adopting a Memorandum Opinion and Order clarifying certain EAS requirements for broadcasters and cable operators.

In 1996, FEMA developed two Civil Preparedness Guides. CPG 1-40 provides guidance to State and local governments to assist them in working with broadcasters and cable operators in their areas to develop State and local area EAS plans. CPG 1-41 is an EAS program guide for State and local jurisdictions.

In 1997, the FCC amended Part 11 by adopting a Second Report and Order modifying EAS as it applies to cable systems. Highlights were:

1. Systems that serve 10,000 or more subscribers shall install EAS equipment and provide EAS audio and video messages on all channels by December 31, 1998.

2. Systems that serve 5,000 or more, but fewer than 10,000 subscribers shall install EAS equipment and provide EAS audio and video messages on all channels by October 1, 2002.

3. Systems that serve fewer than 5,000 subscribers shall either provide national level EAS messages on all programmed channels (including the required EAS test messages), or install EAS equipment and provide a video interrupt and audio alert message on all programmed channels and EAS audio and video messages on at least one programmed channel by October 1, 2002.

4. Wireless cable systems shall participate in EAS on the same basis as wired cable systems. Wireless cable operators that serve 5,000 or more subscribers per fixed station transmission site or head end shall install EAS equipment and provide EAS audio and video messages on all channels by October 1, 2002. Wireless cable operators that serve

less than 5,000 subscribers are subject to the same requirements as wired cable systems that serve fewer than 5,000 subscribers.

5. The requirements of existing local franchise agreements for special warning systems will not be preempted by the EAS so long as they do not conflict with EAS requirements under FCC Part 11 rules. (See website address in Appendix B).

In 1998, the FCC adopted a Third Report and Order in response to a Second Further Notice of Proposed Rule Making concerning amending the EAS rules that would prohibit cable systems from overriding broadcasters' emergency related programming with state and local EAS messages. The FCC reaffirmed its earlier decision whereby cable operators and broadcasters should reach a mutual agreement concerning the override of television signals on cable systems.

Also, the FCC sent a letter to FEMA asking if FEMA and the White House Communications Agency (WHCA) wanted to continue use of the EAS Authenticator Lists for national level messages. The Authenticator Lists were used to verify procedures and personnel under conditions that no longer existed under the EAS. The new EAS equipment at broadcast stations and cable systems operates automatically upon receipt of a national level message with the proper codes in the EAS digital signal. After checking with WHCA, FEMA responded by letter dated August 25, 1998, that they and WHCA had no further requirement for the EAS Authenticator Lists.

The FCC's EAS Handbook, required to be posted at EAS broadcast and cable control points, was updated in 1998 to reflect deletion of the authentication procedure. However, it still contained references to outdated national level procedures. This temporarily caused confusion in the broadcast and cable communities should a national level activation take place before the Handbook would be reissued.

The FCC established the National Advisory Committee (NAC) to replace the Emergency Broadcast System Advisory Committee (EBSAC). EBSAC had replaced the National Industry Advisory Committee (NIAC) in 1986. NAC held its first meeting in 1998 to both organize and discuss EAS issues. They met once each subsequent year. While the NAC was primarily a group of broadcast engineers tracing its lineage to engineers critical to making CONELRAD work, the membership was gradually expanded to include cable operators and emergency managers and other stakeholders in EAS. The NAC saw its mission as providing:

1. Liaison to the SECC committees

2. Information and training to improve EAS operations

3. Feedback to the FCC on actual EAS operations that included best practices as well as challenges.

In 2000, Part 11 was amended by FCC Order adopted March 31, 2000, to conform to the discontinuance of the use of the EAS authenticator Lists.

In 2001, the FCC adopted a Notice of Proposed Rule Making to:

1. Solicit comment on requested revisions to the Part 11 rules governing EAS set forth in petitions for rule making filed by the National Weather Service (NWS) and the Society of Broadcast Engineers (SBE).

2. Revise Part 11 to eliminate references to the now-defunct Emergency Action Notification (EAN) network and its participants, the major networks and cable program suppliers.

3. Delete the requirement that international High Frequency (HF) broadcast stations purchase and install EAS equipment.

In 2002, the FCC adopted a Report and Order amending Part 11. This was in response to the NWS and SBE petitions. The technical and operational revisions included the following:

1. Add new digital EAS codes for state and local events, including a Child Abduction Event Code, and new location codes.

2. Permit broadcast stations and cable systems to program their EAS equipment to selectively display and log state and local EAS messages.

3. Increase the time for each participating EAS entity to re-transmit the EAS monthly test from 15 to 60 minutes of receipt of the message.

4. Revise the minimum required broadcast modulation level of EAS codes to conform to established broadcast audio processing techniques.

5. Permit broadcast stations to air the audio of a Presidential EAS message from a higher quality, non-EAS source.

6. Eliminate references to the now-defunct Emergency Action Notification (EAN) network.

7. Eliminate the requirements that international High Frequency (HF) broadcast stations purchase and install EAS equipment and cease broadcasting immediately upon receipt of a national level EAS message.

8. Exempt satellite/repeater broadcast stations that rebroadcast 100% of the programming of their hub station from the requirement to install EAS equipment.

9. Authorize cable systems serving fewer than 5,000 subscribers to meet the October 1, 2002 deadline by installing certified EAS decoders, to the extent that such decoders may become available, rather than both encoders and decoders.

10. Provide that low power FM stations need not install EAS decoders until one year after the Commission certifies any such decoders.

In 2002, the NAC held its last meeting and was not continued by the FCC. The FCC did not renew its Charter when it expired in July 2002. The FCC established the Media Security and Reliability Council (MSRC) consisting of senior broadcast executives (www.fcc.gov/MSRC/). MSRC was particularly interested in the survivability and restorability of broadcast facilities during crises. Several committees of front-line workers were formed under MSRC and two of these are addressing some key EAS issues.

Thus, the EAS and its predecessors have been in development for more than 50 years, each time adapting several times over that period to meet changing needs and new technologies. From the late 1970's to the early 1990's, considerable effort was made to train state and local personnel in EAS operations and to develop state and local plans. This work has come to a virtual halt in recent years as Federal funding and personnel have been withdrawn.

Federal Funding for State EAS Plans and Infrastructure

During the history of the EBS/EAS, the Federal Government funded some portions of the system through such programs as the Broadcast Station Protection Program (BSPP) and the Emergency Action Notification (EAN) network. Funding for the EAN Network was eliminated in 1995. BSPP funding was reduced to zero in the 1980s. BSPP funding did resume building the PEP system, but the funding was only for the PEP system and not the EAS system as a whole. When BSPP funding dried up, there was hope that states and local sources would fill the void, possibly through the use of the funds that are provided by FEMA grants to the states or the federal funds that are distributed after large-scale disasters. But, essentially funding for the system dried up.

Today, the only federal funding for any part of the EAS has been through the Primary Entry Point Advisory Committee (PEPAC). PEPAC, Inc. is a not-for-profit incorporated group that exists to advise and manage the Primary Entry Point (PEP) program. Membership is made up of representatives from each of the PEP stations. Officers are elected annually from the membership. FEMA plays no part in its management. Up to 2001, PEPAC received $150,000 annually from FEMA. This money was used to maintain the infrastructure equipment at the PEP stations originally provided by FEMA in earlier years and for training PEP station engineering staff. The infrastructure includes EAS equipment specific to the PEP program, Electromagnetic Pulse (EMP) protection, and emergency power systems including fuel storage. The program has up to now funded rigorous annual testing and preventive maintenance of the emergency power generator, the fuel tank, fuel quality testing, and testing and preventive maintenance of the EAS and HF equipment. The training program includes regular contact with the PEP station by telephone, email, etc. The most important function is an annual meeting of the participants. The training program that is the heart of this annual meeting was devised and carried out by PEPAC in response to increasingly rapid turnover in PEP station personnel and station ownership. The annual meeting agenda provides for orientation and refresher presentations and discussions critical to the program and at least one

major technical presentation specific to the program and its future. All the costs for this program were contained within the $150,000 annual budget, although funding was missed for one year.

The Federal Government through the Department of Justice is now making available several million dollars in matching grants for state AMBER programs. The funding is not specifically intended for EAS and could be spent in other areas specific to recovery of abducted children such as changeable highway signs. Within the grant's guidelines, individual states are supposed to determine what aspects of its AMBER program will receive the funding. While some of this money could be used to improve state EAS infrastructure, it is unlikely this funding will be of any significant benefit to EAS. There is no way of knowing if this funding is going to be only a onetime opportunity. Observation: This funding source cannot be counted on to provide near term or sustaining support for EAS.

Society of Broadcast Engineers (SBE): The SBE, to the degree it is able to, has tried to fill the vacuum in EAS training and management both at the national and local chapter levels. The SBE EAS Committee and SBE FCC Liaison Committee efforts receive a great deal of voluntary support from SBE members. The broad headings for this support are for education of LECC and SECC members, and Comments and Reply Comments on FCC items. Observation: There is at this time no money available for travel and other activities separate from national and regional events through the SBE.

National: The SBE supported the now extinct FCC National Advisory Committee (NAC) comprised of top EAS experts. This committee worked with the SBE Board and the SBE Liaison Committee to make comments to the FCC on EAS issues. The Chair of the SBE Liaison Committee offers services on a travel cost reimbursement basis to local SBE chapters, regional conventions, and others who want intensive EAS training. Observation: Presently, SBE is not able to provide financial support for the Chair's EAS activities.

Local: Many local SBE chapters support EAS activities. Observation: The degree of support is voluntary with no real financial support.

State Broadcaster Associations: Within the last year, especially when the AMBER issue surfaced, several State broadcaster associations lent their support. Motivated by members who have raised concerns about failed tests and other EAS issues, some funded projects to help. Notable but not alone in this effort are the California Broadcasters Association, Nevada Broadcasters Association, Arizona Broadcasters Association and the New Jersey Broadcasters Association. Observation: Since any support and funding comes from station members, there is no assurance that these efforts will continue or expand to other states' broadcaster associations.

States: While some states have funded positions having some management oversight over the EAS, the people in these positions are often not devoted exclusively to EAS duties. Some states have purchased EAS equipment for their Emergency Operating Centers and 911 centers, but even some of these are not linked to the system. There is a great lack of training for personnel who use the equipment. Observation: Funding for travel and meetings is almost

non-existent and often depends on volunteer resources.

Local areas: Very few local areas fund positions within emergency management for the EAS. Most address EAS programs and issues with one or more people who have other full time jobs. Very few localities have purchased EAS origination equipment. Observation: Other funding for the EAS is essentially non-existent.

Funding Objectives

The Government to Media Subcommittee of the FCC Media Security and Reliability Council (MSRC) recently surveyed the SECC (EAS) Chairs concerning the state level EAS (see Appendix D). In the survey many states identified issues having to do with outdated or poor state EAS plans, lack of functional links between emergency management warning origination points and broadcast and cable EAS entry points. This lack of funding came up as a major concern repeatedly in the survey. Also identified was the lack of EAS-specific training for law enforcement and emergency management. As to physical infrastructure elements that could benefit from funding, current thinking indicates that a state-by-state needs assessment would have to be conducted. Some EAS experts believe that this needs assessment itself would have to be a funded project.

State government interest in supporting EAS varies widely from state to state. As might be expected, California, Florida and other areas like the so-called "Tornado Alley" region and states most often in the path of hurricanes and that experience frequent natural disasters commit more resources to EAS. In many states, there is a desire to improve EAS plans and infrastructure, but the funds and direction needed are lacking. In far too many states there seems to be little or no interest at this time in supporting the EAS with financial and other resources.

The FCC does not have a clear mandate, the funding or the personnel for oversight and/or coordination of EAS that goes much beyond basic compliance with EAS Rules, some involvement along with FEMA in the PEP, and some contact with EAS issues through the FCC MSRC. The FCC Field Enforcement Bureau does continue to inspect broadcast stations and cable systems for EAS equipment as part of their overall compliance program and their fines have been increasing. While not a specific funding issue, there is no longer any FCC review of EAS State plans or connectivity between emergency management and the broadcast stations and cable systems by the FCC. The FCC no longer appoints State Emergency Communications Committee (SECC) Chairs. Existing state Alternate Broadcast Inspection Programs may have some component of EAS overview, but presently there is no way of knowing their effect on EAS operations. In most cases, this task has fallen on a small number of unpaid volunteers who lack both the personal resources and authority to achieve success.

EAS System Concerns

While deserving of attention as a part of an overall look at the EAS, security risks should be kept in perspective. Even a false activation of EAS would not, by itself, have catastrophic results. Research into the behavior of warning recipients suggests that a single false alarm, without corroboration from other credible sources, generally elicits only limited reaction from the public. This interpretation is supported by the history of actual false alarms; for example, the extremely limited effects of the erroneous national attack warning issued accidentally on February 20, 1971 over the (then) EBS network. Even a properly authenticated and genuine-appearing warning may not generate a strong reaction if it contradicts an overall perception of limited current risk. This underscores the importance of managing, integrating and coordinating EAS seamlessly with other available warning systems.

Nonetheless, the vulnerabilities of EAS could be exploited during periods of heightened public anxiety and uncertainty. Also, Internet Provider (IP)-based EAS systems and control links could be subjected to "denial of service" attacks aimed at preventing them from functioning when they should, as could any other IP-based information stream. Those most familiar with the EAS system acknowledge that there are security issues with the system as it stands today. Many of these issues are direct results of a system that was conceived, designed and deployed at a time when system security was not as much of a national concern and threats within our national borders were considered to be highly unlikely.

The EAS system today is most often used to disseminate weather warnings and more recently Amber alerts. There are many instances of EAS having been used locally to warn of civil emergencies, evacuations, and other emergencies. These are not well documented because of their local, rather than national, nature. Low cost and ease of operation for local warnings were the primary design criteria for EAS technology. Sophisticated security and encryption were not. The complete protocol is a matter of public record.

Because of the attacks upon our country, the emergency management community has been forced to take a hard look at the security of all protocols used to disseminate information to the public during emergencies. Since proper and timely use of such tools is supposed to result in the mitigation of loss of life and property in response to acts of terrorism of many forms, EAS security is now very much an issue. Since attacks involving chemical or biological weapons are likely to require use of the EAS system to provide official alert information to the public, it is within the realm of possibility that an attacker could decide to either cripple the EAS itself or use it to spread damaging disinformation. Although such scenarios must be considered for the future, no malicious activations of the EAS system have been reported to date.

EAS distribution methods have perhaps the greatest potential for security concerns. The system as it exists today uses a wide variety of distribution links arranged in an uncoordinated and sometimes-complex architecture that is specified in State and local EAS plans. While it is theoretically possible to seize some of these communications links with minimum effort or expertise, a successful perpetrator would have to possess knowledge of monitoring

assignments, know a great deal about relative Radio Frequency (RF) signal levels, and be able to comply with protocol requirements to create a successful disruption or a system override. Since two Frequency Modulated (FM) RF signals on the same channel can sometimes act in unpredictable ways, inserting a viable bogus link would require at minimum a high power transmitter and a directional antenna aimed at each potential entry receive point.

In some locations broadcast stations and cable systems are running in the unattended mode. This is permitted as long as certain FCC rules are followed. However, when a station is operating unattended and no operator is physically at the station, no one would be available on-site to intervene should an unauthorized seizure occur. In fairness, it must be noted that unless a broadcast station is operating under those FCC's Part 73 rules for unattended operation, an operator is always on duty. At this time, most broadcast stations serving large populations do not operate unattended.

There is also a concern about physical security and unauthorized use of the system at EAS activation sites. All FCC certified EAS encoders have the capability for password security for activation. It is up to each station and cable system to implement sufficient security. At this time, there is no way of knowing which stations use password security and which do not. However, lack of password security does not in and of itself mean an unauthorized EAS event can be aired. Other stations' security measures may be in place. Again, there is no way at this time of cataloging the station-by-station overall security picture.

Another valid concern is the potential for unauthorized use of the system. Thousands of station operators have been trained in the use of the encoders, ranging from part time interns to chief engineers. Most operators have been taught to use the equipment without any form of background investigation. Absent a station-by-station survey, there is no way to know what the actual state of physical security might be, particularly at stations that run in the aforementioned unattended mode. Mitigating this risk is the fact that a single bogus EAS activation at any one station will not cause a national warning crisis. As will be shown in the next section, the risk for unauthorized activations by operators at PEP stations is even lower.

At the national level of the EAS system, we find the network of Primary Entry Point stations strategically located throughout the country that are reserved for use by the President in times of utmost need. These links do utilize electronic authentication, but it is theoretically possible (though technically quite difficult) to interfere with one or more of the links. In the late part of 2001, an engineering group within the Primary Entry Point Advisory Committee (PEPAC) concluded that the most secure portion of the EAS is the national level. While the PEPAC task force developed specific information on why PEP is more secure than other parts of the EAS, it might not serve the public interest to go into more detail in this unclassified report.

The EAS system is now being asked to play a significant role in our national warning strategy. Lack of federal coordination as well as a source of assured funding at any level necessary to allow for a reasonable level of control and scrutiny over a critical unmanaged and voluntary system contribute to valid security issues and concerns. The FCC has oversight of EAS system compliance. Oversight of the other aspects of EAS is in reality a loosely defined but combined ad hoc effort by the FCC, NWS, and FEMA, Homeland Security and

volunteer State and local EAS Committees. As a result, there is confusion over exactly who is responsible for system security and what the security standards and measures should be, especially at the state and local levels.

How the EAS Works

EAS is our primary national warning system. As provided for in Title 47, Chapter 1, Code of Federal Regulations, Telecommunications, Federal Communications Commission, Emergency Alert System, Part 11 (see website address in Appendix B):

1. "The EAS provides the President with the capability to provide immediate communications and information to the general public at the National, State and Local Area levels during periods of national emergency."

2. "The EAS may be used to provide the heads of State and local government, or their designated representatives, with a means of emergency communication with the public in their State or Local Area."

If the President ever decides to issue a national alert (none has ever done so), a White House Communications Agency (WHCA) Officer contacts the FEMA Operations Center (FOC) or FEMA Alternate Operations Center (FAOC) immediately through special communications channels from wherever the President is located. The FOC or FAOC then activates the Primary Entry Point (PEP) system. Calls are placed simultaneously to the 34 PEP radio stations across the country and U.S. territories. After appropriate handshaking, the transmitters at the PEP stations come under government control. Programming on the PEP stations is pre-empted and the President has an open channel to communicate his message. A Presidential message containing the EAS national level code, alert tones and an audio message follows. The audio message can be for an unlimited time and is terminated upon transmission of the EAS End Of Message (EOM) signal. EAS entry points in each state (broadcast stations, EOCs, State EMA Agencies, etc.) monitoring a PEP station will have their EAS equipment captured and transmission of the Presidential message will begin. The message will then be distributed through each state EAS system provided that the state has a working EAS plan. State EAS entry locations need to monitor at least one PEP station. As specified in FCC Part 11, those stations that have elected to terminate programming during a Presidential message will go off the air. They will return to the air upon receipt of a second EAS message containing another EAS national level code. Any broadcast station or cable system in compliance with the FCC's rules for unattended operation will be a de-facto participant in the EAS since properly installed, maintained and tested EAS equipment is a Part 11 unattended operation requirement. The above procedures are specified in the FCC EAS Handbooks for AM, FM and TV broadcast stations and cable systems (see website addresses in Appendix B).

State and local alerts may be inserted into EAS by several methods:

1. The National Weather Service issues watches and warnings by transmitting a complete EAS message on NOAA Weather Radio (NWR). Many broadcast and cable

stations purchased EAS equipment equipped with receivers that can monitor NWR.

2. According to Part 11, broadcasters and cable operators are permitted to originate an EAS alert. Since both civil and weather warnings should come from entities with the legal responsibility for public warnings, many EAS experts believe that this permitted activity should be viewed as an emergency backup capability.

3. A growing number of state and local emergency managers and law enforcement agencies have EAS equipment and enter EAS tests and warnings directly through broadcast stations and cable systems identified in EAS plans. In a few areas officials can originate EAS events through their local NWR station. Procedures to implement the above methods should be included in a State and Local Area's EAS plan.

4. State and local emergency managers can call the local National Weather Service office or a broadcaster to request that an alert be issued according to procedures and authentication methods that should be in published local and state EAS plans.

When EAS is being implemented in a given region, broadcasters, cable operators, emergency managers and others concerned form State and Local Emergency Communication Committees (SECC or LECC). They design a monitoring plan that determines what entities will serve as the EAS sources and originators of messages (EOCs, 911 centers, NWR, etc.). All other broadcast stations and cable systems must monitor the originating sources. They also decide what communications assets are available, who is authorized to issue warnings, how they will do so, which EAS codes will be issued in their region, and how and when officials will participate in EAS tests. The stakeholders comprising the committees design the most effective EAS communications web, determine EAS monitoring assignments, and set up times and dates for EAS Required Monthly Tests (RMTs). They also decide who is authorized to issue warnings, how they will do so, proper authentication procedures and which EAS codes will be considered as essential within their region. Thus, the state and local plans map out how the system is “wired together.” It is a given that EAS will be more likely to work correctly if the relevant LECC and SECC plans are complete, up to date, and undergo rigorous periodic testing. If tests uncover problems with an element of a plan, necessary adjustment can be made in a timely manner.

As outlined previously, all radio and television stations and cable television systems are required to broadcast national alerts immediately or leave the air. Stations and cable entities may, however, choose whether to broadcast un-expired state and local alerts and may decide to postpone broadcasting the alert until there is a natural pause in programming. No figures are available as to how many of the broadcast stations and cable systems voluntarily carry local EAS activation requests. Estimates suggest only about 50% do so.

Since 1976, the predecessor of EAS, the Emergency Broadcast System (EBS), operated under a Memorandum of Understanding (MOU) between the FCC; the Defense Civil Preparedness Agency, now an element in FEMA; NWS; and the FCC's National Industry Advisory Committee (NIAC). The MOU defined a framework for a cooperative effort for developing and evaluating effective EBS plans and related capabilities at the State and local levels of

EBS operations. The MOU was last updated as an Agreement in 1981. It has not been updated to reflect EAS. Presently, successful operation of EAS depends on the following committees of volunteers:

1. The Primary Entry Point Advisory Committee (PEPAC) convened by FEMA

2. State Emergency Communications Committees (SECCs)

3. Local Emergency Communications Committees (LECCs)

4. EAS Committees of the Society of Broadcast Engineers (SBE), the Society of Cable Telecommunications Engineers (SCTE) and by numerous local chapter activities of these two groups.

For EAS to operate effectively, state and local jurisdictions require a plan that specifies when and how the EAS may be activated. Support for developing and maintaining EAS plans has decreased over the years. Furthermore, the EAS is essentially an un-funded Federal government mandate, with the FCC focusing on enforcement of EAS regulations. Therefore the present EAS is quite inhomogeneous and prone to failure, unlike the earlier EBS where more operational plans were in effect.

In summary, EAS was established on November 10, 1994, to replace the EBS. Through rigorous oversight, planning and testing, EAS can function as an integral part of a warning system at the national, state and local levels.

EAS and NOAA Weather Radio

Even though EBS and NOAA Weather Radio (NWR) had been complementing each other as provided in the EBS plans developed since 1976, there was a disconnect between the two systems because they used different signaling techniques. EBS employed a two-tone signal and NWR used a single tone signal. After extensive testing by NWS in the 1980s, NWR started to use a new digital protocol as its signaling technique. NWS named their digital protocol, “Specific Area Message Encoding” (SAME). When the FCC adopted its EAS digital protocol in 1994, it was identical to NWR's digital protocol. Initially, there was a minor difference between EAS and SAME in the code structure. Because of the operational nature of broadcast stations and cable systems, EAS messages needed to have codes for date/time and identification of the entity transmitting or re-transmitting the message. NWS expanded the SAME code structure to include all of the EAS codes. Thus the two protocols and the code structures became identical. Therefore, SAME/EAS signals received via NWR, AM, FM and TV stations and cable systems can be decoded using the same decoder. Broadcasters and cable operators can monitor each other and NWR with their EAS equipment. Appendix H contains examples of SAME/EAS messages.

Historically, EBS and EAS activations for weather warnings have far exceeded the activations for non-weather events. However, this is changing because of Amber child abduction plans now in place in many states and local areas. The February 2002, FCC Report and Order that

increased the number of EAS event and location codes will also be a factor. Most of the new codes are for non-weather events and may motivate local emergency managers and law enforcement officials to plan for better local emergency public information that encompasses better emergency warnings. The new codes will allow for more specific text displays on EAS equipment, television sets, and displays in public venues. The new codes could lead to better information for displays such as changeable highway message signs that are not really a part of or directly connected to the current EAS.

An important part of the EAS and NWR data structures is how locations are identified in the messages. Every SAME/EAS message contains a location code or codes to identify the message target area(s). Every state, county, part of a county, and off shore (marine) area, has a specific number according to the Federal Information Processing Standard (FIPS) and NWS warning areas. Even after all of above locations are cataloged, there are still hundreds of unused FIPS numbers that could in theory be used to identify unique areas and situations such as nuclear power plant zones, military bases, neighborhoods, and even groups of individuals such as police, emergency personnel, etc. Therefore, EAS might in the future be better targeted to any of these unique areas and situations, provided procedures and equipment are in place ahead of time. Oregon and Washington are two states now using unique FIPS codes in certain special warning areas.

Most warning experts agree that the use of EAS by civil authorities needs to increase since this is where both the authority and responsibility for issuing local warnings really rests. One way to accomplish this is if civil authorities purchase, install and operate EAS equipment and create robust communications links to local NWR entry points and to entry points for broadcast stations and cable systems. Then, through established EAS planning processes and longstanding industry cooperation, many more civil authorities will be able to directly transmit emergency messages on NWR and broadcast and cable facilities accurately, rapidly and seamlessly. And with prior coordination, the messages can be transmitted even when the facilities are unattended. With almost 1,000 NWR transmitters, NWR is a significant national asset that has a proven track record saving lives and property. Its interface with EAS is a crucial link in the nation's warning structure.

Cable in the EAS

The cable television industry has a long history of involvement in providing emergency alerts, but had not been involved in EAS until more recently. The local alerts were usually required by the local franchise authority and controlled by the mayor or other local official where all channels went to black and live audio from a telephone dial-up replaced the program audio. The FCC adopted a phase-in of EAS obligations for cable systems after the industry was formally brought into the program pursuant to the 1992 Cable Act.

Cable television systems transitioned into EAS by system size. Systems serving more than 10,000 subscribers were required to begin participation by December 31, 1997. Systems serving fewer than 10,000 subscribers were required to participate by October 1, 2002. Generally, all cable systems are required to provide the alerts visually and aurally on all channels. An exception was made for systems below 5,000 subscribers to provide audio

messages on all channels with the visual message on a single channel. The cost of participation for small systems can be very high on a per subscriber basis. Limiting the visual message to a single channel allows the use of lower cost, legacy equipment.

With a cost of $6,000 and up for basic EAS equipment packages, very small cable systems were hard-pressed to afford participation. While the FCC declined to exempt small cable systems from the EAS, waivers to delay EAS implementation have been granted upon sufficient showing of need. Small systems owned by large Multiple System Operator (MSO) companies could afford to purchase the equipment but systems owned by small independent operators often could not without having larger systems' revenue to help spread the cost.
The FCC granted over 260 waivers for approximately 2,500 small cable systems to delay implementation from 12 to 36 months.

Cable Override Techniques -- Analog

Cable operators ordered EAS encoder/decoder units similar to those used by broadcast stations. These units were then tied to three primary switching network types listed below in order of lowest to highest cost.

1. Comb Generators – A cable television system headend originates the complement of channels delivered to the subscribers and can be thought of as a collection of individual, low-power television transmitters. A comb generator is a box that generates a complete set of substitution channels all using the same audio and video source. Earlier versions of comb generators supported audio only and blacked out each channel's picture. The single channel visual approach for small systems allowed the reuse of these older units, where they already existed. When an EAS message is received, an automatic switch activates switching from the complement of channels to the comb generator box to affect the override. This approach is also known as Radio Frequency (RF) switching.

2. IF switch – Each channel is processed to a common Intermediate Frequency (IF) before being up-converted to its individual output channel. An IF switch substitutes the EAS visual and aural message to each channel, yielding a higher signal quality message than using the comb generator approach. IF switching is more expensive, but allows the option of selectively switching in order to not override broadcast signals that already have EAS messages in place. Selective override is a difficult process with a comb generator requiring extensive filtering.

3. Baseband switch – Baseband switching replaces the individual audio and video signals with the EAS message. Another baseband option allows overlaying the visual message onto the top line of the video programming in a less disruptive manner than a full screen override.

Cable Override Techniques – Digital

Digital channels are more difficult to interrupt than analog channels. With digital, switching is

accomplished in the individual subscriber's Set Top Box (STB) converter. Presently, there are only two approaches:

1. Force tune method – When an EAS alert is received, a signal is broadcast to all digital receiving devices (e.g., STB or DTV) commanding them to tune to a specific analog channel that is carrying the alert message. At the conclusion of the message, the digital receivers tune back to the channels they were tuned to prior to the alert.

2. Overlay method – When an EAS message is received, a signal is broadcast to all digital receiving devices. This signal contains data for the receiver to compose a text banner at the top of the screen with the visual EAS message and an audio computer file of up to two minutes duration to replace program audio. Because the audio file is limited to two minutes, a warning such as an EAN national alert must use the force-tune method since an EAN can exceed the 2-minute limitation imposed on all other alerts.

The two digital override methods are described in the Society of Cable Telecommunications Engineers (SCTE) standard SCTE 18 2002 (formerly DVS 208), Emergency Alert Message for Cable, approved as a joint standard with CEA as ANSI-J-STD-042-2002, and available at www.scte.org.

Cable Television EAS issues

1. Weighing subscriber disruption and irritation (dealing with phone calls) vs. alerting to hazards.

2. Local franchise-required alerts – conflict between local franchise-required alerts vs. EAS alerts. Requirement for maintaining two override systems and preventing collisions. These franchise-required alerts can also override local television reports dealing with an emergency. In this situation, FCC regulations specify, "Cable systems and wireless cable systems may elect not to interrupt EAS messages from broadcast stations based upon a written agreement between all concerned. Further, cable systems and wireless cable systems may elect not to interrupt the programming of a broadcast station carrying news or weather related emergency information with state and local EAS messages based on a written agreement between all parties".

3. Amber - How to provide meaningful information to subscribers when the cable system's EAS equipment is operating in an automated mode.

4. Difficulty in targeting alerts to affected areas versus widespread distribution of alerts.

EAS Patent Issues

In 1992, Patent Number 5,121,430 was issued to Quad Dimension Incorporated for the transmission of messages over radio and television stations. The patent has been re-issued several times based on re-examinations initiated by the Department of Commerce. The

outcome of the patent issue is unknown at this time.

EAS Structure

One of the primary goals of the EBS planning program in 1976 was to develop an organized monitoring structure using the new EBS equipment. With this goal in mind and with the cooperation of broadcasters, NWS personnel and emergency officials, two prototype plans were developed for use as model plans. One was a local plan for Parkersburg, West Virginia, and the other was a state plan for New Hampshire. A key local broadcast station was selected in Parkersburg for the other stations to monitor for EBS messages. Similarly in New Hampshire, a key local station was selected for each EBS local area. The key stations then monitored each other to form a state network with one of the stations acting as the state entry point for New Hampshire state level EBS messages. Eventually almost all states were able to adopt this concept using the Parkersburg and New Hampshire models. In a few states, it was impossible to form a network because of the distance between the key local stations. Some states solved this problem by using satellite networks or statewide radio and television networks to connect to the key local stations. As examples, Nebraska uses its statewide Public Television Network, California uses its Emergency Digital Information Service (EDIS), and Florida uses a satellite service. The evolution of these relay systems occurred at low cost and used facilities that were already in place for other purposes. Many of these networks were linked in a series configuration. This made them prone to single point failure.

The main problem with the old EBS daisy-chain monitoring concept was that the FCC EBS regulations required that only one source be monitored. This meant that the monitoring chain would be broken if just one station failed to forward a message. This problem was eliminated with the establishment of EAS. FCC EAS regulations require that broadcasters and cable operators monitor at least two sources for EAS messages. Also, they must receive at least one weekly EAS test from each source. When the new EAS plans were developed, they incorporated many of the monitoring assignments developed in the EBS plans with additional assignments to counter the daisy-chain problem. Almost all new EAS equipment is capable of monitoring up to six different assignments. Some EAS plans even have NWR as a secondary key local source as long as the local NWS office fully participates in EAS. These are permitted on a trail basis. There are a couple of NWS offices that have FCC-Certified EAS equipment to send and receive EAS tests and local and state non-weather alert messages, but there are no procedures and authorities for those NWS offices to broadcast EAS national level messages longer than two minutes duration. Appendix E shows part of the EAS structure and Appendix F contains a list of equipment manufacturers that sell FCC-Certified EAS equipment.

Another concept that is becoming an integral part of EAS is the development of state and local web monitoring structures that expand EAS monitoring into a true web model. Under this idea, broadcast stations, cable systems, emergency operating centers, and NWS offices have EAS equipment set to monitor each other's signals in a robust web arrangement. In a web structure, there is no one central station or facility that is critical to the system. Local officials and NWS personnel can originate EAS messages and broadcasters and cable operators can receive the messages from multiple sources.

Since the terrorist events of September 11, 2001, and a more recent flood of new child abduction plans, there is growing interest in improving state and local web monitoring structures. The trend is that with proper planning, broadcast stations, cable systems, emergency operating centers, and NWS offices can develop much more reliable and robust EAS monitoring webs.

National Level and The Primary Entry Point System

National level EAS messages, including Presidential messages, originate from Federal government control points. Today, the messages are distributed through the Primary Entry Point (PEP) system to selected broadcast stations throughout the country including Alaska, Hawaii and Puerto Rico. PEP stations were selected based on the location of the station's transmitter site in relation to predicted nuclear blast overpressure zones. The combined signal coverage area of all of the PEP stations is in theory approximately 90% of the continental U.S.

When CONELRAD and EBS existed, the primary method of distributing national level (Presidential) EAS messages was through the Emergency Action Notification (EAN) Network, essentially a dedicated circuit to the major radio, television, cable and wire service networks. The networks then disseminated the message to their affiliates. The overall distribution of the network programming was under the control of what AT&T called their “Long Lines” group. The broadcast networks (ABC, CBS, NBC, etc.), national cable program suppliers (HBO, ESPN, etc.), and wire services (AP, UPI, etc.), voluntarily participated in the EAN network by providing personnel to operate EAN equipment at their program control centers. The Defense Civil Preparedness Agency (DCPA), a part of the Department of Defense, and later the Federal Emergency Management Agency (FEMA), leased the EAN equipment and dedicated communications circuits from AT&T.

The PEP concept was formulated in 1983 when the FCC and FEMA began studies to develop new national "Last Resort" EBS procedures. At that time, the breakup of AT&T was jeopardizing the viability of the existing EAN procedures because AT&T would no longer be in total control of reconfiguring the telecommunications infrastructure. In addition, the broadcast networks began moving their program distribution from AT&T to their own leased satellite facilities.

In 1987, FEMA began funding PEP through an existing FEMA/FCC program called the Broadcast Station Protection Program (BSPP). The additional funding was used to increase the survivability of the selected PEP broadcast stations and enhance the national "Last Resort" procedures. Participating PEP station transmitter sites were provided with an emergency generator, fuel tank, programming equipment, a shelter area, and a communications link to FEMA via the Public Switched Telephone Network (PSTN). This was later supplemented with a non-standard EAS encoder/decoder wired so that each PEP station's programming could be taken over automatically for a PEP message.

In the early 1990s, FEMA established and funded the Primary Entry Point Advisory

Committee (PEPAC) as a not for profit Corporation to advise FEMA concerning the operations and improvements for the PEP system. PEPAC, Inc. is composed of one representative from each PEP station. This group elects a Board of Directors. In 1995, FEMA notified the FCC that funding for the EAN network was going to be discontinued and that the PEP system was going to be the only method to activate the national level EAS and transmit Presidential messages. The EAN equipment at the industry network control points and the dedicated circuits were removed from operation. Thus, the major networks and wire services were disconnected from the national level EAS.

The Federal government conducts secure weekly closed circuit tests of the PEP system by sending signals to the EAS equipment at each PEP station site. Also, as part of the readiness of the national level EAS, all broadcasters and cable operators are required to transmit EAS weekly and monthly tests to ensure their EAS equipment is in operating condition.

As part of a carefully structured plan that will lead to national PEP testing, PEP decoders at each station have already been programmed so they can originate weekly tests triggered by the FEMA Operations Center. All PEP stations have conducted successful tests of this function. The next step will be to do a PEP version of the EAS Required Monthly Test (RMT). The PEP RMTs will likely have an audio message in them to more closely emulate a real national message. All of this is working toward a coordinated national PEP test that could carry the voice of the President. Even though the test would sound like the normal RMT heard over each EAS entity once a month, such a test would likely be well publicized to avoid creating undue public concern.

In a real national emergency, a PEP message would interrupt all broadcast and cable programming for the President's message. A PEP message has priority over all other EAS events and will even interrupt a state or local EAS message in progress. State EAS entry points (broadcast stations, State Emergency Operating Centers, etc.) monitoring PEP stations would receive the message and relay it in real time to all of stations and cable systems in their state. A study by the FCC in the late 1990s revealed that many EAS state entry points couldn’t monitor a PEP station signal even though the combined PEP station signal coverage area is approximately 90% of the continental U.S. The FCC NAC worked with National Public Radio (NPR) to address this issue. The NPR Board approved using their satellite distribution system (cue channel) to allow NPR member stations to relay PEP messages into any state or local area EAS system in the country. There are several other approaches now under consideration by FEMA, PEPAC and others to reinforce the PEP distribution system including:

1. Adding more PEP stations and finding new communications links between the PEP stations and the state EAS entry points.

2. Adding more network entities to become part of PEP.

3. Authorizing a dedicated and secure PEP satellite distribution network.

4. Adding secure Internet connections.

Even though no on-air tests of the PEP system have been conducted, there is convincing evidence to support that the system is capable of performing its mission. In 1997, an operator error at the PEP FEMA Operations Center caused an internal PEP test message to be transmitted over a few PEP stations. Stations that were monitoring these PEP stations had their programming immediately interrupted with the test message, proving for the first time albeit on a limited basis that the PEP concept really worked. The operator error problem has been corrected by revising the PEP operating procedures.

PEP is designed as a last resort system that is available to the President under the direst national emergency situation. But to be successful, PEP must interface with state EAS systems to reach the rest of the 14,000+ broadcast stations and 10,000+ cable system headends. In the view of many EAS experts PEP would only be needed if the President would not have instant access to the resources of the National Press Corps. This resource is the best and fastest way for the President to talk to the available listening and viewing public.

Options For Inputting State and Local Information into EAS

As specified in the FCC Part 11 regulations, EAS plans contain guidelines that must be followed by broadcast and cable personnel, emergency officials and National Weather Service (NWS) personnel to activate the EAS. The plans include the EAS header codes and messages that will be transmitted by key EAS sources (NP, SP, SR and LP). State and local plans contain unique methods of EAS message distribution such as the use of FM and TV subcarrier signals. According to FCC regulations, EAS plans must be reviewed and approved by the Director, Office of Homeland Security, Enforcement Bureau, FCC, prior to implementation to ensure that they are consistent with national plans, FCC regulations, and EAS operation. A State plan contains procedures for State emergency management and other State officials, the NWS, and broadcast and cable personnel to transmit emergency information to the public during a State emergency using the EAS. A Local Area plan contains procedures for local officials or the NWS to transmit emergency information to the public during a local emergency using the EAS. Local plans may be included in the State plan. A Local Area is a geographical area of contiguous communities or counties that may include more than one state.

Broadcast Station Protection Program

Over the years, the protection provided under this program has proven to be invaluable when local emergencies knock out commercial power. BSPP stations are able to remain on the air to provide emergency information to the public.

At the start of the EBS planning program in 1976, over 600 broadcast stations were participating in the BSPP. As EBS state plans were developed and key state entry point stations were selected, BSPP equipment had to be provided to these selected stations because of their standing in the overall EBS structure. In some cases the BSPP equipment was moved from one station to another depending on the station's status within the state plan. During the 1980s, funding for the BSPP decreased to almost zero until the PEP program started. In the mid 1990s, FEMA began removing the BSPP underground fuel tanks because of concerns

that they might begin to leak fuel. Some stations elected to take ownership and responsibility for tanks while others wanted the tanks removed. Today, there are over 300 stations in the BSPP that still have BSPP equipment in service including the PEP stations. At the PEP level, there is oversight and budget through the PEPAC whose purpose is to assure all PEP equipment is maintained properly and tested.

State EAS Planning

A key factor in the state EAS planning process is the work of dedicated and knowledgeable volunteers. While there has been a history of State level broadcast committee activity going back to the CONELRAD days, current State Chair appointments to what are now called the SECCs are traceable to several sources. Some SECC Chairs received their appointments to the old EBS National Industry Advisory Committee (NIAC) and/or the EBS Advisory Committee (EBSAC). The FCC Chairman and the FCC Defense Commissioner usually signed their appointment documents. Some received their appointments through recommendation from the outgoing Chair while others were appointed through their State's emergency management offices. Presently, the FCC claims no authority to appoint State EAS Chairs. They say this responsibility resides at the State level. As of this time, there is no clear procedure on how State Chairs are nominated and who actually makes the appointment.

To effectively interface with the national level EAS and the PEP system, all state EAS plans need to be current and tested regularly. Development and maintenance of EAS plans are voluntary as well as the transmission of state level EAS messages. Some SECCs have roots dating back to CONELRAD and EBS. They have always led in state plan development. As stated by the FCC in its November 1994, Report and Order, "State and local SECCs and LECCs are responsible for the development of plans which detail procedures for stations and officials to follow for activation of the EBS (EAS)." These committees, made up of appointed volunteers, have performed a largely unsung and unpaid public service over the past 40 years. Members have come from the ranks of the broadcast engineering community, professional emergency management, and public safety telecommunications experts. To this core group has been added a growing number of state broadcaster association leaders, news directors and law enforcement communications specialists. The latter ranks have swelled now that a growing number of child abduction programs are tied into EAS.

As stated above, state plan development began in 1976 after the FCC adopted the EBS two-tone attention signal. The two-tone signal provided a reliable method to alert station operators and was deemed an excellent opportunity to begin the development of state plans. Also, a General Accounting Office (GAO) report after the Xenia, Ohio, tornado in the early 1970s, recommended that the country's three warning systems be made to work together to provide a unified warning system. At that time the three systems were EBS, NOAA Weather Radio (NWR) and the National Warning System (NAWAS). As a result, the FCC, NWS, DCPA (now FEMA), and the National Industry Advisory Committee (NIAC), agreed to pool resources to finalize a state plan in all the states under an ambitious schedule. Appendix I contains a copy of the 1981 agreement between the four entities. The plans included procedures on how the three Federal systems would complement each other at the state and local levels. Working with the SECCs, at least one EBS planning workshop was scheduled in

every state. After 5 years every state had finalized a plan. Work then began to develop local EBS plans in each of the 600+ EBS Local Operational Areas. Eventually, over 400 EBS local plans were developed. Appendix D contains a current list of the EAS State and Territory plans.

Local EAS Planning

Local EAS planning is usually performed by Local Emergency Communications Committees (LECCs). The SECC Chair appoints LECC Chairs. In states that do not have appointed LECC Chairs, local plans are usually included in the state plan. Most states developed their state plan before developing their local plans. To date, over 100 local EAS plans have been developed.

Local planning was always an important issue because the vast majority of emergencies occur at the local level. State activations are few in number while local activations number in the thousands per year (Appendix C). With the advent of AMBER activations, the number of state and local activations will undoubtedly increase.

Planning at the local level involves several factors. Development of a local warning plan should include the following.

1. Meeting of the key local participants.
2. Defining local area boundaries.
3. Identifying area assets and authorities.
4. Identifying the sources of warnings and emergency information.
5. Developing local warning messages.
6. Identifying the types of emergencies that affect the area.
7. Developing authentication procedures.
8. Identifying the public distribution systems, i.e., communication links from local authorities to the public.
9. Conducting regular tests of the plan with local official participation.

Many local EAS committee efforts have seen the same volunteer dedication and spirit as in the state committees. As in the case of state committees, broadcast engineers are now being joined by all stakeholders in the EAS process to plan and work together. Many local committees use email list servers to replace weekly or monthly meetings common in early EBS and EAS days.

Numbers of EAS and EBS Messages Transmitted

On November 10, 2002, there was a very large outbreak of tornadoes that stretched from Mississippi to Pennsylvania. Seventy-five persons died. Due to the magnitude of this event, NWS formed a service assessment team to examine the warning and forecast services provided to emergency managers, government agencies, and the public. Some of the data collected by the team involved the interface between NWS and the media for eight EAS Local Areas stretching from Indiana to Pennsylvania. All of the EAS Local Primary sources (in this case they were all radio broadcast stations) in the eight areas monitor NWR. They received 76 messages via NWR during this outbreak. Using their EAS equipment, they re-transmitted 48 of the messages, most within 18 seconds. Those messages that were not re-transmitted were messages that were either for areas beyond the EAS Local Area or were not warning messages. Based on the monitoring assignments specified in their state and local EAS plans, broadcasters and cable operators are required to monitor the LP sources in their area for EAS messages. However, they are not required to receive or re-transmit state or local messages. If they elect to re-transmit the messages, broadcasters and cable operators are permitted to send them in either an EAS or non-EAS format (no digital or alert signals), such as video crawls, symbols, etc.

Between 1983 and 1986, the FCC received 3,915 EBS activation reports from broadcasters. Broadcasters filed the reports voluntarily. All of the activations were for local emergencies. Included in the reports was a question concerning what organization had requested EBS activation. NWS was the requesting organization 76% of the time while Emergency Services requested 10%, broadcast station staff 7%, and via an EBS receiver alert 7%. These statistics probably still hold true today since the great majority of EAS activations are for weather warnings issued by NWS through NWR.

Another set of data for 4,168 EAS activation reports was analyzed for the years 1990, 1991 and 1992. NWS was the requesting organization 68% of the time while Emergency Services 8%, broadcast station staff 5%, and via EBS receiver alert 14%. The increase in EBS receiver alerts as the activation vehicle can be attributed in part to the fact that more stations were relying on the receiver as a means of receiving emergency information. This is possibly due to stations cutting costs by dropping news staff, wire service affiliation, or direct monitoring of NWR and NOAA Weather Wire. Appendix C contains the data for the above analysis plus EBS activation statistics for each state and territory.

Undoubtedly, there will be increased EAS activation by Emergency Services as EAS equipment is installed in EOCs and emergency services personnel become trained in EAS operations.

EAS Audience

EAS reaches a very large number of people during the day, but a very limited number overnight. Radio stations reach 95% of Americans older than 12, but Americans listen to the radio on average only 12% of their day, mainly between 6 a.m. and 6 p.m. (Arbitron, 2001 Radio Today). While as many as 22% of the population may be listening at any given time during the day, less than 1% are listening in the middle of the night. More than 98% of U.S.

households have at least one television but the average set is in use only 31% of the day (Nielsen Media Research, 2000 Report on Television), and 17% of the households (Satellite Broadcasting and Communications Association) now get their signals directly from direct broadcast satellite sources that do not participate in EAS. While the EAS does include codes that could activate devices while people are sleeping or otherwise not tuned in, only a few companies are producing such devices. The following statistics are from the Television Bureau of Advertising and the Radio Advertising Bureau:

	Total U.S. Households		# of people/HH		% of HH with Media		# of Americans with Media
TV	**108,620,000**	**x**	**2.7**	**X**	**98.2%**	**=**	**288 million Americans w/one or more TVs**
Radio	**108,620,000**	**x**	**2.7**	**X**	**98.5%**	**=**	**289 million Americans w/one or more radios**

TV Stats Courtesy of the Television Bureau of Advertising (TVB)

- 98.2% of all U.S. households have television sets. This percentage has been the same for the past five years.
- In 2003, 75.2% of U.S. households have more than one set.
- In 2001, Nielsen Media Research reported that the average TV household watches seven hours and forty minutes of TV a day.
- Based on U.S. Census data, there were 2.62 persons per household in 2000. That number is rounded up to 2.7 for the above figures.

Radio Stats Courtesy of the Radio Advertising Bureau (RAB)

- RAB reports 98-99% of all Americans own one or more radios. The penetration of radio is so great that the U.S. Census stopped recording this data after the 1990 Census.
- Radio reaches 96% of all consumers every week and 77% of all consumers every day.
- Each week, persons age 12+ spend an average of 20 hours tuned in to their favorite stations.
- Among persons 12+, 37% of radio listening takes place at home, 44% takes place in the car and 20% is done at work or in other places besides the home.
- Radio reaches 84% of adults age 18+ each week while they're driving.

Cell Phone Statistics

- As of the date of this report, there are at least 147 million Americans carrying cellular phones according to the Cellular Telecommunications and Internet Association (CTIA). The latest statistics are available at www.ctia.org.

Where Americans Turn in a Crisis

Harris Interactive, a worldwide market research and consulting firm, reports that adults in the U.S. referred to the television (78%) and the radio (15%) as their primary source of information after the terrorist attacks on the World Trade Center and the Pentagon. A survey conducted by TVB on consumer media habits and perceptions found that broadcast television is cited by more adults as their primary news source than other mediums (broadcast TV was named by 43.6%, cable TV by 28%, newspapers by 12.1%, radio by 9.2%, public TV by 3.9%, and the Internet by 3.2%).

Television Households

Year	Total U.S. Households	TV Households	% HH with TV
2000	102,680,000	100,800,000	98.2%
2001	104,080,000	102,200,000	98.2%

2002	107,400,000	105,500,000	98.2%
2003	108,620,000	106,700,000	98.2%

To obtain a rough estimate of how many millions of Americans these numbers convert to, a check was made on the average number of persons in a household through the U.S. Census Bureau. In 2000, there were 2.62 persons per household.

Equation: 102,680,000 x 2.62 x 98.2% = 264 million Americans

To get a more recent number, round up the average number of persons in a household to 2.7.

Equation: 108,620,000 x 2.7 x 98.2% = **288 million Americans with TVs**

% of Radio Listeners on Weekdays & Weekends

Time Frame	Percentage
Monday-Sunday 6 a.m. to 10 a.m.	85%
Monday-Sunday 10 a.m. to 3 p.m.	85.6%
Monday-Sunday 3 p.m. to 7 p.m.	83.8%
Monday-Sunday 7 p.m. to midnight	62.4%
Monday-Sunday midnight to 6 a.m.	37.2%

Additional Stats
According to the Gale Book of Averages, there are 2.4 TV sets in each U.S. household and 5.6 radios per household.

EAS Looking Forward

Our current EAS system was designed in the early 1990's and began deployment in 1997 to AM, FM and television broadcast stations and in 1998 to cable systems. The system, when deployed represented the application of the best engineering practices available at the time given the specific design constraints of a system that must provide in band audio signaling, and remain relatively inexpensive to allow deployment nationwide. Designed as an all hazards warning system with an emphasis on delivery of national, state and local warnings including NWS warnings, there was no apparent need for central control or significant security considerations. The existing EAS system of today has many positive attributes. It carries traffic on a daily basis, and is available now to disseminate a warning to our populations at risk.

But the system of today is not without problems of such a significant nature as to render its suitability for the task at hand to be in serious question. Support has been lost of many broadcasters and cable operators who generally consider today's EAS to be a largely un-managed and an un-funded federal mandate for a system that they need to participate in and maintain which in their view basically does not work. This is not the case in all states and EAS acceptance and participation varies from state to state. Its un-managed voluntary nature at the state and local levels, and daisy chain delivery system contribute to what essentially becomes a "black hole of assured delivery".

The EAS system of tomorrow can be built today, if we utilize the existing EAS technology already in place. We have available for our use as a foundation, a system with a build-out that

includes over 14,000 broadcast stations and 10,000 cable systems. A system that is capable with minor modifications of delivering reliable warnings to large and small geographic areas and populations. This existing infrastructure should be used to meet our national need for a viable system. Any new system design should take advantage of this existing infrastructure and be fully backwards compatible with the existing equipment that is in place. It would be difficult to replace or rebuild such a capability today at a reasonable cost.

Technology has of course moved on. There are significant new technologies available to designers today that can be used to supplement and improve the capabilities of the existing EAS system. Perhaps of the greatest significance is the ability of satellites to deliver an EAS message directly to broadcast or cable outlets. Satellite technology can be used to deliver an EAS message very quickly (within seconds). It is very reliable, has available high levels of security, and does not have the geographical limitations of today's EAS system. Satellite facilities currently exist in nearly all radio, television, and cable systems for the purpose of delivering network feeds. These systems with proper coordination could easily be configured to carry EAS traffic.

The Internet is another new technology that may have an impact on the EAS system. Although not suitable for use as a primary delivery mechanism, it does provide great value as a redundant or back-up path for communications. One very great value of the Internet is its widespread deployment and general availability at most broadcast and cable outlets, as well now in many homes and businesses.

The Public Television Network is building out a digital transmission capability that when completed anticipates penetration of their digital signal to 95 percent of the population. These stations have a demonstrated commitment to public broadcasting and can clearly define a benefit to both their network and the public that they serve, resulting from an expanded role in carrying emergency management information and the delivery of warnings to the general public. Such a digital network, if integrated into the national warning strategy could play a significant role in reliable warning dissemination to both the public and the first responder community.

Although FCC regulations permit the use of the two-minute audio window for the delivery of text and video messages, those standards have yet to be developed or implemented. Future systems may use IP technology to digitally encode the audio, text or video message and transmit a file rather than actual audio. Digital messages are much more suitable to today's transmit media. Satellite delivery would use IP rather than delivery of audio, and as such would also be able to transmit text files, photos, and streaming live audio if necessary.

One of the greatest challenges to establishing the existing EAS system as a critical component of our nation's warning systems is overcoming the difficulties that result from its current configuration as an un-managed system with essentially no funding. In order for any system to be considered as a "national" warning system, it needs to be a managed and funded system. The digital transmission medium of today can easily support the interactive requirements of such a managed system.

EAS can also benefit from the development of an EAS chip. The EAS chip would be capable of responding to emergency alerts according to the specific programming entered by the owner of the device. It would be available to alert the user of threatening events even if the actual host device is turned off. Such a device could save many lives annually, particularly in areas of the country that are subject to significant hazardous weather activity.

Much of this section has been devoted to the gains and benefits possible by using existing digital technology such as satellite distribution and Internet connectivity to supplement and strengthen both the delivery capabilities and security of the existing EAS system. Such an approach would be fully backwards compatible with the equipment already in place and present a great value for a minimal expense. This solution may suffice for the next 5 to 7 years. Technology advancements would dictate that we begin to consider now the next generation of the EAS system. Significant changes in sensor abilities, data processing capabilities, delivery techniques, and alerting mechanisms will all contribute to the EAS system of the future.

Recommendations

Based upon this assessment, the Partnership for Public Warning makes the following recommendations regarding the future of the Emergency Alert System:

THIS SECTION BEING DEVELOPED

Appendix A – Acronyms and Definitions

AP: Associated Press news wire.

BSPP: Broadcast Station Protection Program established in 1963 to protect certain broadcast facilities deemed necessary to broadcast Presidential EBS messages. Selected stations were provided with an emergency generator, fuel tank, programming equipment, fallout shelter, and two-way radios to link the broadcast station with a local Emergency Operating Center. The intent of the BSPP was to try to insure that a large number of stations would be operable after a nuclear attack.

CONELRAD: Control of Electromagnetic Radiation, a system defined in 1951 and implemented by 1953 that required most broadcast stations to go off the air during a national emergency and allowed the remaining stations to operate only on 640 and 1240 kilohertz. This prevented an enemy from using a bomber or missile attack based on guidance to targets by detection of the frequencies of broadcast stations.

CPG: Civil Preparedness Guide, a document developed by FEMA that provides instructional information to emergency management officials.

DCPA: Defense Civil Preparedness Agency (DCPA), a part of the Department of Defense. Many of its responsibilities were transferred to FEMA in 1979.

DTMF: Dual Tone Multi Frequency. A technique for encoding digital information in an analog broadcast stream.

EAN: Emergency Action Notification message sent by the President over EBS and EAS.

EAN Network: New name for the national level EBS dedicated circuit upgraded in 1986.

EAS: The Emergency Alert System established by the FCC in 1994 to replace EBS. EAS equipment was officially deployed in 1997.

EAT: Emergency Action Termination message sent over the national level EAS after the EAN message.

EBS: The Emergency Broadcast System developed in 1963 to replace CONELRAD. In 1994, EBS was replaced by the EAS. EAS equipment deployment began in 1997.

EBSAC: Emergency Broadcast System Advisory Committee formed in 1986 by the FCC to replace a part of the NIAC. The EAS National Advisory Committee (NAC) replaced EBSAC in 1998.

ELA: Equipment Loan Agreement used in the BSPP.

EMP: Electromagnetic Pulse.

EOC: Emergency Operating Center.

EOM: End Of Message code sent at the end of each EAS message.

FCC: Federal Communications Commission.

FOC: FEMA Operations Center where testing and activation of the PEP network originates.

FEMA: Federal Emergency Management Agency formed in 1979 by President Carter to bring together the Federal Insurance Administration, the National Fire Prevention and Control Administration, the National Weather Service Community Preparedness Program, the Federal Preparedness Agency of the General Services Administration and the Federal Disaster Assistance Administration activities from HUD. Civil defense responsibilities were also transferred to the new agency from the Defense Department's Defense Civil Preparedness Agency.

GAO: General Accounting Office.

Last Resort EBS Procedures: Procedures developed in 1983 and implemented beginning in 1987 for the President to utilize EBS to communicate with the American people in a situation where all other communication channels failed. This became the PEP in 1987.

LECC: Local Emergency Communications Committee formed to develop local plans for EAS.

LP: Local Primary designation used in EAS to describe a source that provides local level EAS messages.

MOU: Memorandum of Understanding.

MSRC: The Media Security and Reliability Council established by the FCC (www.fcc.gov/MSRC/).

NAC: National Advisory Committee established by the FCC in 1998 to replace the EBSAC. Its charter was not renewed when it expired in July 2002.

NAWAS: National Warning System. A system used to disseminate warning messages between Federal, State and local level officials.

NIAC: National Industry Advisory Committee established in 1958 by the FCC and replaced in 1986 by the NSEPAC and EBSAC.

NOAA: National Oceanic and Atmospheric Administration in the Department of Commerce.

NORAD: North American Air Defense Command.

NP: National Primary designation used in EAS to describe a source that provides national level (Presidential) EAS messages. These sources are connected to the PEP system.

NSEPAC: National Security and Emergency Preparedness Advisory Committee formed in 1986 by the FCC to replace part of the NIAC.

NTIA: National Telecommunications and Information Administration of the Department of Commerce.

NWS: National Weather Service, a part of NOAA.

NWR: NOAA Weather Radio operated by NWS as a means to broadcast weather information to the public.

OCD: Office Of Civil Defense, a part of the Executive Office of the President.

PEP: Primary Entry Point system developed under FEMA beginning in 1987. The PEP currently uses dialup phone lines to 3 radio stations that reach approximately 90% of the continental U.S. to deliver a Presidential message through EAS.

PEPAC: Primary Entry Point Advisory Committee established by FEMA and incorporated as a not-for-profit entity.

PSTN: Public Switched Telephone Network.

RMT: Required Monthly Test, an EAS test that includes all four elements of an EAS message, digital header signal, two-tone attention signal, audio message and digital EOM signal.

RWT: Required Weekly Test, an EAS test that includes a minimum of two elements of an EAS message; the digital header signal and the digital EOM signal.

SAME: Specific Area Message Encoding. A method developed by the NWS in the 1980s to send special digital codes via analog radio giving the type of weather event, the locations affected, and the time period in which the message is valid. First implemented in the early 1990s over NWR and later adopted as the protocol for EAS in 1994.

SBE: Society of Broadcast Engineers. Has a very active EAS Committee that recommends actions to the SBE's Board and coordinates many EAS education and training activities in more than 100 SBE local Chapters.

SCTE: Society of Cable Telecommunications Engineers. Has a very active EAS Committee.

SECC: State Emergency Communications Committee formed to develop state plans for EAS.

SP: State Primary designation used in EAS to describe a source that provides state level EAS messages.

SR: State Relay designation used in EAS to describe a source that relays state level EAS messages.

UPI: United Press International news wire.

WHCA: White House Communications Agency.

WHSR: White House Statement of Requirements.

WR-SAME: NOAA Weather Radio transmissions containing the SAME signaling technique.

Appendix B – Important EAS Documents Available

The following documents are available on the FCC EAS web site at www.fcc.gov/eb/eas.

1. Notices of FCC actions concerning EAS
2. EAS Handbooks – AM/FM, TV and Cable editions
3. Chapter 1 Title 47 of the Code of Federal Regulations Part 11 - Emergency Alert System (EAS), FCC, April 17, 2000
4. Several EAS State and Local Plans
5. EAS Fact Sheet
6. List of companies certified by the FCC to sell EAS equipment
7. EAS Reports and Orders – 2002, 1998, 1997, 1994

The following documents are available from the organizations identified in the descriptions:

Emergency Alert System, FEMA Civil Preparedness Guide CPG 1-40, May 1996.

Emergency Alert System: A Program Guide for State and Local Jurisdictions, FEMA Civil Preparedness Guide CPG 1-41, May 1996.

Plan for Nationwide Use of the Emergency Broadcast System for State and Local Emergencies, FCC, June 28, 1976.

Presidential Decision Directive 12472, Executive Office of the President.

SBE Primer on EAS.

SCTE Video on EAS.

White House Statement of Requirements, 1995, FEMA.

Appendix C – EAS Activation Statistics

1. Reports for 1990, 1991 and 1992

Organization requesting EBS Activation	1990	1991	1992	Total	Percent
National Weather Service	911	992	950	2853	68%
Emergency Services	131	72	129	332	8%
Broadcast station staff	113	35	48	196	5%
EBS receiver alert	194	130	241	565	14%
Other (wire service, etc.)	99	80	44	223	5%
Total	1448	1309	1412	4169	

2. Reports for January 1983, through April 1986.

Organization requesting EBS Activation	1983	1984	1985	1986	Total	Percent
National Weather Service	1088	917	868	118	2991	76%
Emergency Services	78	95	176	52	401	8%
Broadcast station staff	68	75	112	10	265	7%
EBS receiver alert	85	92	66	15	258	7%
Other (wire service, etc.)						
Total	1319	1179	1222	195	3915	

Of the 1,887 EBS activations reported in 1993, 895 (47 percent) were by key local EBS stations. These stations not only alert their own audiences, but they also alert many other stations that monitor their signal for EBS alerts and tests. From 1977 to August 1994, 18,396 reports received by the FCC were distributed as follows:

Alabama	152	Kansas	43	Maryland	199	Pennsylvania	1,901
Alaska	29	Kentucky	673	Massachusetts	468	Puerto Rico	24
American Samoa	1	Louisiana	229	Michigan	295	Rhode Island	29
Arizona	35	Connecticut	38	Minnesota	252	South Carolina	96
Arkansas	137	Delaware	19	Mississippi	122	South Dakota	104
California	174	D C	14	Missouri	1,580	Tennessee	127
Colorado	27	Florida	191	Montana	9	Texas	3,107
Connecticut	38	Georgia	73	Nebraska	259	Utah	8
Delaware	19	Guam	0	Nevada	15	Vermont	38
D C	14	Hawaii	25	New Hampshire	41	Virgin Islands	6
Florida	191	Idaho	49	New Jersey	97	Virginia	231
Georgia	73	Illinois	486	New Mexico	528	Washington	122
Guam	0	Indiana	1,832	New York	437	West Virginia	87
Hawaii	25	Iowa	88	North Carolina	996	Wisconsin	317
Idaho	49	Kansas	43	North Dakota	46	Wyoming	25
Illinois	486	Kentucky	673	Ohio	2,270		
Indiana	1,832	Louisiana	229	Oklahoma	134		
Iowa	88	Maine	11	Oregon	45		

Appendix D - State and Territory Plans and Structure

State/Territory	Date of Plan	EAS Areas	State Network	PEP Station
Alabama	1996	9	AL Public TV/Satellite	
Alaska	1998	23	UHF Radio/Satellite	1
Arizona	1998	10	Telephone	1
Arkansas	2001	12	Satellite	
California	1999	20+1	Microwave/Satellite	2
Colorado	1997	13	Off Air Monitoring	1
Connecticut	2001	1	Microwave/Telephone	
Delaware	1997 (Draft)	3	Off Air Monitoring	
D. C.	1998 (Draft)	1	Off Air Monitoring	
Florida	2000	12	ESATCOM Satellite	1
Georgia	1999	12+1	GEMA Satellite	1
Hawaii	2000 (Draft)	4	State Civil Defense	1*
Idaho	1999	3+1	State Relay	1
Illinois	1998	10	IEMA 45 MHz	1
Indiana	2000 (Draft)	12	Off Air Monitoring	
Iowa	1999	12	Off Air Monitoring/Fiber	
Kansas	1997	9+2	Satellite	
Kentucky	1999	14	Off Air Monitoring	
Louisiana	2000	7	Off Air Monitoring/Satellite	1
Maine	1997	4	Off Air Monitoring	
Maryland	1996 (Draft)	7+1	Off Air Monitoring	1
Massachusetts	1997	7	Telephone	1
Michigan	1999	12	Off Air Monitoring/Satellite	
Minnesota	2000	7	MPR Satellite	1
Mississippi	1996	9	Off Air Monitoring	
Missouri	1997 (Draft)	12+2	State Police Network	1
Montana	1998 (Draft)	20+1	Some Off Air Monitoring	1
Nebraska	2001	5	ETV/NPR	
Nevada	1997 (Draft)	2+1	NWR	1
New Hampshire	2000	10	State Police Microwave	
New Jersey	2001	7	NWR/OEM 800 MHz	
New Mexico	1998 (Draft)	8	Telephone	1
New York	1998	31	Off Air Monitoring	2
North Carolina	1996	10	Microwave	1
North Dakota	1997	7+1	Off Air Monitoring	1
Ohio	1996	12	Off Air Monitoring/Fiber	2
Oklahoma	1999	14+1	ONN Satellite	
Oregon	1997	14+2	OPB/Microwave	
Pennsylvania	1999	24	EMN Satellite	
Rhode Island	1996 (Draft)	1	Off Air Monitoring	
South Carolina	1999	6+1	Off Air Monitoring/ERN	1
South Dakota	2001	9	SDPTV Microwave	
Tennessee	1996	9	Off Air Monitoring/Satellite	1
Texas	1998	25	Off Air Monitoring/TSN	2
Utah	1999	10	CEM VHF Radio	1
Vermont	2000 (Draft)	5	Off Air Monitoring	
Virginia	1997	13+1	Off Air Monitoring/VNN	1
Washington	1997	13+3	Microwave/VHF Radio	1
West Virginia	1999	14	Off Air Monitoring/NWR	

Wisconsin	2000	9	WI Public Radio Network	
Wyoming	1998 (Draft)	11	Off Air Monitoring	1
American Samoa		1	Off Air Monitoring	
Guam		1	Off Air Monitoring	
Puerto Rico	1996 (Draft)	7	Off Air Monitoring	1
Virgin Islands	1997	2	Off Air Monitoring/NWR	1

+ These are areas that are a part of an Interstate area with an adjacent State.
***** Hawaii State Emergency Operating Center.

Appendix E - Structure Flow Chart

34 PEP Stations
Selected AM and FM Broadcast Stations

54 EAS State/Territory and District of Columbia Entry Points
Broadcast Stations, State Emergency Operating Centers, Statewide Networks, Public Radio and Television Networks

500+ Local Primary Sources
Broadcast Stations, Local Emergency Operating Centers, 911 Facilities, etc.

Public Information Distribution
14,000+ Broadcast Stations, 10,000+ Cable Systems, NOAA Weather Radio, Pagers, Internet, Cell Phones

Appendix F - Equipment Manufacturers

Encoder/Decoder

TFT Inc., 2243 Ringwood Avenue, San Jose, CA 95131, www.tftinc.com

SAGE Alerting Systems Inc., 700 Canal Street, Stamford, CT 06902, www.broadcast.harris.com/radio/sage

HollyAnne Corporation, 207 West Connor Avenue, Greeley, NE 68842, www.eas-hollyanne.com

MultiTechnical Services, 150 Clayton Commerce Center, Clayton, NC 27520, mts-comm.com

M&N Electronics LLC, 2921 Lackland Road, Suite 202, Fort Worth, TX 76116, (817) 595-3050

Burk Technology Inc., 7 Beaver Brook Road, Littleton, MA 01460, burk.com

Gorman Redlich Manufacturing Co., 257 West Union Street, Athens, OH 45701, gorman-redlich.com

Cadco Systems Inc., 2363 Merritt Drive, Garland, TX 75041, cadcosystems.com

Trilithic Inc., 9710 Park Davis Drive, Indianapolis, IN 46235, trilithic.com

Decoder

TFT Inc., 2243 Ringwood Avenue, San Jose, CA 95131, tftinc.com

Appendix G - Web Sites

Federal Communications Commission - www.fcc.gov/eb/eas

Federal Emergency Management Agency - www.fema.gov (click on Preparation & Prevention)

National Weather Service - www.nws.noaa.gov (click on Weather Radio)

Partnership for Public Warning - www.partnershipforpublicwarning.org

Federal Information Processing System (FIPS) - www.itl.nist.gov/fipspubs/fip6-4

National Emergency Management Association (NEMA) - www.nemaweb.org

Society of Broadcast Engineers (SBE) - www.sbe.org (click on EAS Information)

Society of Cable Telecommunications Engineers (SCTE) - www.scte.org/standards (click on standardssubcommitteeseas)

Amber Plan (on web site www.missingkids.com)

Emergency Digital Information Service (EDIS) - www.edis.ca.gov

Appendix H - Example Messages of the SAME/EAS Format

SAME and EAS message format

DIGITAL HEADER	ALERT TONES	AUDIO MESSAGE	END OF MESSAGE
//////// //////// ////////	---------- SAME 1040 Hz or EAS 853 Hz and 960 Hz	limited to 2 minutes	///////// ///////// ///////// NNNN NNNN NNNN

Required Weekly Test (digital header portion) message sent by all radio and television stations and cable systems

ZCZC-EAS-RWT-011001-024009-024017-024021-024031-024033-024037-051013-051043-051047-051600-051610+0030-1141550-WTOP

A required weekly test (RWT) has been issued for the following counties/areas: District of Columbia (011001) Calvert, MD (024009) Charles, MD (024017) Frederick, MD (024021) Montgomery, MD (02431) Prince George's, MD (024033) Saint Mary's (024037) Arlington, VA (051013) Clarke, VA (051043) Culpeper, VA (051047) Alexandria City, VA (051600), Fairfax City, VA (051610) at 11:50 AM (1550) on April 24 (114), 2002 effective until 12:20 PM (+0030) WTOP

Required Monthly Test (digital header portion) message sent by a key EAS broadcast station

ZCZC-EAS-RMT-011001+0030-1140742-WTOP

A required monthly test (RMT) has been issued for the following counties/areas: District of Columbia (011001) at 3:42 AM (0742) on April 24 (114), 2002 effective until 4:12 AM (+0030) WTOP

Tornado watch message (digital header portion) originated by the National Weather Service

ZCZC-WXR-TOA-051113-051153-051187+0600-1221838-KLWX/NWS

The National Weather Service (WXR) has issued a tornado warning (TOA) for the following counties/areas: Madison, VA (051113) Prince William, VA (051153) Warren, VA (051187) at 2:38 PM (1838) on May 2 (122), 2002 effective until 8:38 PM (+0600) KLWX/NWS

Child Abduction Emergency (AMBER digital header portion) message originated by civil authorities using the new EAS codes

ZCZC-CIV-CAE-024009-024017-073535+0600-1241938-CALVPOL

Civil Authority (CIV) has issued a child abduction emergency (CAE) for the following counties/areas: Calvert, MD (024009) Saint Mary's, MD (024017) Chesapeake Bay adjacent to Calvert County (073535) at 3:38 PM (1938) on May 4 (124), 2002 effective until 9:38 PM (+0600) Calvert Police

Appendix I – 1981 State and Local EBS Memorandum of Understanding

STATE AND LOCAL
EMERGENCY BROADCASTING SYSTEM (EBS)
MEMORANDUM OF UNDERSTANDING AMONG
THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA),
FEDERAL COMMUNICATIONS COMMISSION (FCC),
THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NOAA),
AND
THE NATIONAL INDUSTRY ADVISORY COMMITTEE (NIAC)

1. PURPOSE

This Memorandum of Understanding defines a framework for a cooperative effort among FEMA, FCC, NOAA's National Weather Service (NWS) and the NIAC for developing and evaluating effective EBS plans and related capabilities at the State and local levels of EBS operations. The agreement addresses the following:

A. The joint and cooperative actions necessary to define and achieve objectives.
B. The joint and individual responsibilities of FEMA, FCC, NOAA's NWS and NIAC.
C. The coordination link between the Federal, State and local levels of government and the broadcast industry.
D. The mechanism required to define the status and objectives, related programming and budgetary needs, and coordinated implementation.

II. REFERENCES

A. Plan for Nationwide Use of Emergency Broadcast System for State and Local Emergencies, revised September 13, 1976.
B. Communications Act of 1934.
C. Executive order 11490, dated October 30, 1969.
D. Executive Order 12127; dated March 31, 1979.
E. Executive Order 12148, dated July 20., 1979.
F. Disaster Relief Act of 1974.
G. Federal Civil Defense Act of 1950, as amended.

III. OBJECTIVES

A. Achieve capabilities at State and local level by which EBS can be used effectively to disseminate warning notifications and emergency public information in relation to natural disaster[1], manmade disaster[2], and attack.
    1. Natural disasters include tornadoes, flash floods, hurricanes, severe winter storms or quickly developing blizzards, volcanic eruptions, earthquakes, tsunamis, ', forest fires, and serious air pollution episodes.
    2. Manmade disasters include civil disorders, commercial power outages, chemical spills, industrial explosions and fires, discharges of toxic

gases, nuclear power plant accidents, transportation accidents involving hazardous materials, and industrial accidents with possible severe environmental pollution episodes.

B. Enhance a unified planning effort of warning dissemination and other emergency information by the broadcast industry, Federal, State, and local government agencies.
C. Develop current guidance, procedures and model plans for State and local activation of the EBS.
D. Evaluate EBS State and local operational area plans and communications system effectiveness, define deficiencies, and program cost-effective upgrading.
E. Assign in the planning, the responsibility for maintaining procedures and lists of authorized persons that can activate the EBS during an emergency.
F. Ensure that the EBS is complementary to existing emergency public information and warning systems and plans.
G. Continue efforts for implementation of new plans and improvement of existing plans at the State and operational area levels. Undertake a cooperative program to evaluate the quality and effectiveness of the operational plans.

IV. AGENCY RESPONSIBILITIES

The responsibilities outlined in this section are those related only to the cooperative efforts of the participating agencies to meet the objectives of this agreement, as it applies to State and local aspects of EBS. FEMA in responsible for:

1. Coordinating with FCC and NOAA's NWS, the scheduling of EBS operational area planning seminars, and providing for appropriate notification to State and local government officials.
2. Assisting in providing instructions to the public through the State and local EBS, in support of effective comprehensive emergency preparedness.
3. Assisting in the development and evaluation of the State and local plans and guidance.
4. Assisting in the establishment of a list of authorized State and local officials who can activate the EBS when required.
5. Coordinating the guidelines of the EBS National Plan with each of its regional offices. FEMA Regional Directors will coordinate representation of State and local emergency management officials at the EBS planning meetings.
6. Monitoring and evaluating the effectiveness of EBS, in support of comprehensive emergency preparedness.

The FCC is responsible for:

1. Maintaining, establishing, revising and coordinating the rules and regulations for the EBS and providing for all coordination with State Emergency Communications Committee (SECC) and Operational Area (Local) Emergency Communications Committee (OAECC) members.
2. Ensuring that the integrity of the EBS is maintained at the State and local level for immediate activation should the need arise.
3. Taking the lead in a continuing education program for local broadcasters, and

State and local officials related to responsible use of the EBS for local emergency public information and warning purposes (including providing literature, displays, and presentations).

4. Providing staff personnel on site to assist in State and local level operational area planning and follow-up assistance as appropriate
5. Maintaining a unified coordination link between the ten subcommittees of the NIAC and the agencies listed in this agreement.
6. Providing FEMA Regional Directors and NOAA's NWS regional office EBS focal points with signed copies of State and local EBS operational area plans when they are completed.
7. Assisting in developing EBS operational area planning meetings and giving official advance notice to FEMA and NOAA's NWS Headquarters.

NOAA NWS is responsible for:

1. Preparing and issuing warnings for quick developing weather events that are life threatening and requesting activation of the EBS using NOAA Weather Radio and NOAA Weather Wire Service and telephone as the primary means of delivery wherever these are available. Earthquake prediction is the responsibility of the U.S. Geological Survey. The NOAA's NWS will disseminate the earthquake warnings. Ensuring that warnings are delivered as quickly *as possible* to all concerned.
2. Establishing NOAA's NWS EBS focal points for dealing with State and local government agencies.
3. Evaluating the effectiveness of using the EBS to disseminate NOAA's NWS warnings to the general public during major and significant natural disasters.
4. Designating a NOAA's NWS EBS program manager to coordinate necessary actions between NOAA's NWS, FEMA, FCC, and the NIAC as well as oversee the necessary activities within *NOAA's NWS.* The NOAA's NWS EBS program manager will notify the NWS regions and field offices of impending meetings and coordinate planning actions
5. Coordinating with the broadcasters and local officials. The NOAA's NWS Meteorologist-in-Charge (MIC) or Official-in-Charge (OIC) of the NWS field offices will suggest which weather events warrant activating the local EBS.
6. Supporting the State and local EBS operational area planning effort. The MIC or OIC will be responsible for coordinating and reviewing NOAA's NWS role and signing the final version-. of the EBS plan for their local warning area of responsibility.

The NIAC is responsible for:

1. Developing a cooperative working relationship between its subcommittees and the participants of this agreement.
2. Studying and submitting recommendations to the FCC from the subcommittees related to the planning and operational procedures of the EBS.
3. Acting as the National representative of industry for this agreement.
4. Developing a cooperative working relationship to foster voluntary participation in the EBS Operational Area Planning by State and local industry members.
5. Assisting SECC and OAECC in the establishment of a list of authorized State and local officials that can activate the EBS when required.

The Joint responsibilities of the four participants are:

1. To provide coordinated advice and guidance to Federal, State and local government officials and the broadcast industry in developing EBS operational area plans.
2. To hold State and local *EBS* planning meetings until all sections of the United States have completed and signed EBS State and local plans and existing plans are upgraded.
3. To assure that State EBS and local operational area plans are tested and exercised and follow-up evaluations are made in each State.
4. To conduct an annual review of the performance of the EBS program during the past year and recommend program changes, as required.
5. To review and develop EBS publications, videotapes, slide presentations and floor displays.
6. To review annually and-revise as necessary the "Plan for Nationwide Use of the Emergency Broadcast System for State and Local Emergency."
7. To develop plans annually to share costs of publications, displays, awards and brochures necessary for the education of industry, government officials and the general public.
8. To assure that each Agency's field offices advise their Headquarters of significant problems or events.

VI. IMPLEMENTATION

A. This memorandum shall take effect upon its signing by authorized representatives of the respective agencies.

B. Within one calendar year of the date of this memorandum, FEMA, FCC, NOAA's NWS and the NLAC will review this agreement, and coordinate such revisions to this agreement as may be necessary.

VII. AMENDMENT AND TERMINATION

A. This memorandum may be amended at any time by mutual written agreement of all parties.

B. The memorandum will be in effect until terminated.

C. The memorandum may be terminated by one or more parties based on a written notification of intent, followed by a period of 90 calendar days of receipt of such notification.

Approved by: Administrator, NOAA, August 3, 1981
Defense Commissioner, FCC, August 20, 1981
Director FEMA November 9, 1981
Chairperson, NIAC, April 21, 1982

Appendix J – PPW EAS Assessment Report Committee Members

Ann Arnold, Texas Association of Broadcasters
Fred Baumgartner, Comcast Cable
Ann Bobeck, National Association of Broadcasters
Art Botterell, Incident.com/CAP
Susan Crawford, Federal Communications Commission
Joanne Donnellan, National Center for Missing and Exploited Children
Clay Freinwald, Chair, Washington Emergency Communications Committee; Chair, SBE EAS
John Fleming, Florida Emergency Management
James Gabbert, Chair, California Emergency Communications Committee
Steve Johnson, Chair, Society of Cable Telecommunications Engineers EAS Group
Larry Krudwig, NOAA National Weather Service, retired
Jerry Lebow, Technical Marketing Consultants, Inc.
Frank Lucia, Federal Communications Commission, retired; PPW EAS Committee Chair
Roland Lussier, Comlabs
Mark Manuelian, CBS Boston; Chair, PEPAC
Don Miller, Washington State Emergency Management Division
Darryl Parker, TFT, Inc.
Harold Price, Bektek
Timothy Putprush, Federal Emergency Management Agency, DHS
Pat Roberts, Executive Director, Florida Association of Broadcasters
Richard Rudman, Chair, Los Angeles Emergency Communications Committee
Greg Sink, Federal Signal Corporation
Peter Ward, United States Geological Survey, retired
Herbert White, NOAA National weather Service
Kelly Williams, National Association of Broadcasters

Sincere apologies to anyone who participated in developing the report but is missing from the above list.

Reports Issued by the Partnership for Public Warning

April 25, 2002 – Comments provided to the Director, Federal Bureau of Investigation, regarding the proposed Homeland Security Advisory System

July 5, 2002 – Comments provided to Governor Tom Ridge, Director, Office of Homeland Security, regarding the proposed Homeland Security Advisory System

November 25, 2002 – "Developing A Unified All Hazards Public Warning System", A Report by the Workshop on Effective Hazard Warnings (PPW Report 2002-2)

May 16, 2003 – "A National Strategy for Integrated Public Warning Policy and Capability" (PPW Report 2003-1)

May 2003 -- Accessing And Originating Warnings from Consequence Management Tools (PPW Report 2003-2)

Copies of the above reports may be obtained from the PPW web site at: www.PartnershipforPublicWarning.org.

For further information on PPW, contact the Partnership at:

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