# ECIG Recommendations

## For a

# CAP EAS Implementation Guide

EAS CAP Industry Group - ECIG

EAS-CAP Implementation Guide Subcommittee

Version 1.0

17 May, 2010

Revision History:

Rev 1  -  January 25, 2010 –Initial Version - Tom Wood

Rev 2  -  February 1, 2010  Minor format updates, added revision history, new suggestions for Originators guide section, updates to Resource sections,  updates to Video display construction, examples, and Test messages–- Tom Wood

Rev 3 – March 21. Integrate answers from the issues matrix.  Removed EAS-STN-ID from drawings and samples. Add additional discussions on scope and update/cancel.  Addressed Red/Orange items.  Integrate content from others, new figures, comments from Jared, Ed, Gary. Added notes to originators.  Added recommendation for new mimeTypes. Changed title. Added EASText. Changed formatting for automatic TOC generation.  Added section on test messages. Added FIPS6 in an older protocols section. Updated with items pending from the Issues Matrix. Added footnote on Speech to Text accuracy– Harold Price

Rev 4 – April 2-5. Changes for initial public release for comments. Added ECIG recommendations to IPAWS CAP Profile. Simplified Alert Text construction method. Improved fonts and formatting. Added section on Language recommendations. Added placeholders for unfinished Figures, examples, and Validation Criteria. Added numerous clarifications and changes agreed on by ECIG Sub-Committee – compiled by Tom Wood

Rev 5 – April 29-May 14. Changes for final release of Version 1.0. New figures, Section 5 and 6 completed, and clarifications agreed on by ECIG Sub-Committee. Compiled by Tom Wood

**Version 1.0**

# Contents

**Version 1.0**

# 1 Introduction

## 1.1 Purpose

Public warnings intended for transmission over the Emergency Alert System (EAS) can be encoded in Common Alerting Protocol (CAP) messages in various ways. As both CAP v1.2 and the CAPv1.2 IPAWS Profile v1.0 make use of several free form text elements and several optional elements, there is ample opportunity for a CAP message rendered by one CAP-to-EAS device to differ when rendered by another vendor's device. There can also be a difference between what the originator intended for an alert, and what alerts contain, when broadcast by CAP/EAS devices.

The EAS-CAP Industry Group (ECIG), formed in 2008 as a group of EAS equipment manufacturers and other interest parties, has produced this recommendation for an Implementation Guide, for use by CAP-to-EAS equipment. The guide is intended to further reduce the areas of uncertainty in how an alert will be presented to the public via CAP/EAS, so that originators and distributors of alerts can deliver the intended message to the public, regardless of the vendors or platforms involved. This guide has not been written to benefit any specific vendor or type of equipment. The goal is general interoperability at a data and messaging level.

This EAS-CAP Implementation Guide has been prepared in light of several points of reference, including the Federal Emergency Management Agency (FEMA) CAP v1.2 IPAWS Profile v1.0 Requirements, the updated CAP 1.2 specification, and other references indicated below. The guide has been written to facilitate the success of any CAP-to-EAS system including existing and planned state, local, territorial and tribal systems; the proposed IPAWS system, and emerging National Weather Service systems. To that end, in addition to addressing general CAP-to-EAS implementation issues, this guide also directly addresses constraints and requirements of the IPAWS program.

## 1.2 Disclaimer of Intellectual Property Claims

The Common Alerting Protocol (CAP) Specification [4]and [5] are copyright 2009 by OASIS (the Organization for the Advancement of Structured Information Standards). The Implementation Guide recommended herein specifies particular usages within the scope of those specifications. The members of the Industry Group have represented that they make no individual or group claim of intellectual property regarding the Profile or to any of the other recommendations presented in this document.

## 1.3 Copyright

This document is copyright 2010 by the EAS-CAP Industry Group. This information in this document may be used freely by anyone, however, when reproduced as a whole, it must contain the attached copyright message. When reproduced in part, or included in another document, the EAS-CAP Industry Group must be included in references as the author of this document.

## 1.4 Terminology

Clarification on terms used in this document:

    A.The Key words MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL in this document are to be interpreted as described in RFC2119.

B.The words warning, alert and message are used interchangeably throughout this document.

C.EAS-CAP Profile is used interchangeably with IPAWS CAP Profile and CAP IPAWS Profile.

D.EAS-CAP Profile Decoder means: A device or software application that performs one or more of the following tasks:

1.Using the EAS-CAP Profile, converts a CAP alert into the CFR 47 Part 11 Emergency Alert System (EAS) format, commonly referred to as the ZCZC string.

2.Using the EAS-CAP Profile, converts a CAP alert into a text string intended for display as video, or input into a Text-to-Speech (TTS) converter, or as input for any other text display; and used in conjunction with an EAS alert.

## 1.5 References

This draft EAS-CAP Implementation Guide derives significant portions of its content from the Requirements for the Integrated Public Alert and Warning System (IPAWS) Common Alerting Protocol (CAP) Profile Implementation Guide, Draft Version 1.0 (8 January, 2010) and the ECIG EAS-CAP Profile Recommendation (EAS-CAP-0.1) (25 September 2008) http://www.cmasforum.com/docs/IPAWS_CAP-to-EAS_Requirements.pdf and http://eas-cap.org/Recommendation%20EAS-CAP-0.1.pdf,

[1]     IPAWS_CAP-to-EAS Requirements . http://www.cmasforum.com/docs/IPAWS_CAP-to-EAS_Requirements.pdf  This document is itself a compilation of work from FEMA and the original ECIG CAP EAS Profile recommendation

[2]     RFC2119  S. Bradner, Key words for use in RFCs to Indicate Requirement Levels, IETF RFC 2119, March 1997. Web: http://www.ietf.org/rfc/rfc2119.txt

[3]     FCC EAS Rules (CFR 47 Part 11). Web: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=47:1.0.1.1.11&idno=47

[4]     CAP v1.2 Committee Draft OASIS Emergency Management Technical Committee, March 2010. Web: http://docs.oasis-open.org/emergency/cap/v1.2/pr03/CAP-v1.2-PR03.pdf

[5]     CAP v1.2 USA IPAWS Profile v1.0 Committee Specification OASIS Emergency Management Technical Committee, October 2009. Web: http://docs.oasis-open.org/emergency/cap/v1.2/ipaws-profile/v1.0/cs01/cap-v1.2-ipaws-profile-cs01.pdf

[6]     CAP v1.1 IPAWS Profile v1.0 Issues List - 1st Public Review, OASIS Emergency Management Technical Committee, Jun 2009. Web: http://www.oasis-open.org/committees/download.php/33000/CAPv1.1-IPAWS-Profile-v1.0-PR01-IssuesList_v2.4.xls

[7]     FEMA IPAWS CAP Profile Requirements FEMA IPAWS Program Management Office *FEMA IPAWS CAP v1.2 Profile Requirements v2.4 - Public*, December 2008. Web: http://www.oasis-open.org/committees/download.php/31084/FEMA_IPAWS_CAP%20v1.1_Profile_Requirements_v2.4_-_Public.doc

[8]     EAS-CAP Profile -EAS-CAP Industry Group EAS-CAP Profile Recommendation EAS-CAP-01, September 2008. Web: http://www.eas-cap.org/Recommendation%20EAS-CAP-0.1.pdf

# 2 General Requirements and Specifications

The FEMA IPAWS Program Management Office submitted the draft IPAWS CAP Profile Requirements document referenced above and available at the URL cited above as the basis for developing an Implementation Guide.

## 2.1 Recommended Additions to the IPAWS CAP Profile Requirements

ECIG advises the following additions which are not contained in [5].

### 2.1.1 Specific mimeTypes

The CAP element <mimeType> identifies the audio or video file format of the indicated content. While [5] identifies the files as "audio", "audio-streaming", "video" or "video-steaming", it does not specify the codec or container format. Thus under the current scenario, EAS CAP equipment would need to determine the content of a file by download and electronic inspection. This is an inefficient and clumsy process and ECIG feels if these mimeTypes included the actual file type name it would be very beneficial. Thus, ECIG recommends that "-wav" and "-mp3" be appended to the existing OASIS mimeTypes when FEMA implements its IPAWS Profile.

By incorporating this ECIG recommendation, the mimeTypes would appear as follows:

> *audio/x-ipaws-audio-mp3*
> *audio/x-ipaws-audio-wav*
> *audio/x-ipaws-streaming-audio-mp3*

Adding a format specific suffix to the base descriptor is a general way to extend the original mimeTypes. Most importantly, this convention will in general allow for a sensible method to introduce new media formats in the future. In this way the mimeType extensions for video can be defined at a later date when formats are determined.

### 2.1.2 New EASText <parameter> Element

ECIG recommends that a new CAP <parameter> element named "EASText" be included in FEMA's implemented IPAWS Profile. This is intended to allow emergency managers and other CAP message originators to dictate the exact text they wish to see conveying their message in TV visual crawl messages and radio and TV aural messages voiced by text-to-speech technology. The specifications and references to the EASText element are already incorporated into this Implementation Guide. If the EASText element is not present, ECIG has described in the Implementation Guide an alternate method to derive the visual crawl and text-to-speech information by building it from various other elements of the CAP message. See the relevant sections of the Implementation Guide for details.

---

## *2.2 Recommended Modifications to the IPAWS CAP Profile Requirements.*

After careful examination, ECIG has found several areas in the FEMA IPAWS Program Management Office Requirements document that warrant reexamination. The EAS-CAP Implementation Guide omits the following recommendations contained in the draft IPAWS CAP Profile Requirement:

1) Ogg Vorbis Audio Format: Although the royalty-free Ogg Vorbis format would appear on the surface to provide cost savings, ECIG is of the opinion that MP3 capability would be needed in all devices anyway if MP3 is to be a part of the system at all. Thus there is no cost savings by adding Ogg Vorbis, and in fact it would add cost and complication as a separate codec is required for Ogg Vorbis. Further, ECIG feels that many of these audio messages may end up posted for public access, and certainly there is a greater number of imbedded MP3 codecs in the public sector than Ogg Vorbis codecs. Finally, because Ogg Vorbis is based on community support there is no guarantee of future support. In fact, Ogg Vorbis has been removed from HTML5, which is to be the future language for web multimedia presentation.

2) DAQ: ECIG feels Delivered Audio Quality is an issue for message originators, and cannot really be enforced back to the original audio source by this Implementation Guide. We feel it is thus out of scope for this Implementation Guide.

3) Text Transcription of Audio Content: ECIG feels there is no reliable software at this time that can produce text from an audio message at the level of accuracy required for emergency messages[1]. At this point in time, we feel the only solution is for message originators to provide matching audio and text within the message when it is authored. Therefore, we feel this is a message originator issue and thus out of scope for this Implementation Guide.

4) Handling Multiple Event Codes: Reference [5] already states that there can be only one <eventCode> with a <valueName> of SAME in a compliant CAP message. If there is an <eventCode> with a <valueName> other than SAME, it will be ignored by EAS rendering devices. ECIG does not see an issue to be addressed here.

---

[1] While speech to text systems with accuracies of 95 to 98% are in use today, they typically require training (a sample of the user's speech reading benchmark text), and optimal conditions (limited background noise). Even at the optimal levels, a 95% accuracy would result in 18 errors in the 1800 character messages proposed here. Speech to text systems that are not trained, use audio with background noise, and an unlimited vocabulary of words, including place names, are much less accurate.

# 3   Implementation Guide Requirements and Specifications

## 3.1  Introduction

The purpose of this section is to provide requirements and technical specifications for originators and consumers of CAP messages that are specifically crafted to trigger the Emergency Alert System (EAS).

For the alerts in the EAS system to be invoked by a CAP alert message, originators must create CAP messages that are constructed in accordance with [5][2]. Likewise, equipment manufacturers must translate FROM these CAP messages constructed in accordance with the same profile to the Federal Communications Commission (FCC) Part 11 target message formats. The following documentation is presented in the form of detailed flowcharts which start with the incoming message based on [5], step through the translation process, and result in an EAS alert.

EAS Decoder specifications can be found in 47 CFR Part 11.33, http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title47/47cfr11_main_02.tpl

The intent of the Implementation Guide is two-fold:

1) All CAP-to-EAS devices MUST generate the EXACT same EAS message for a given CAP message. To do otherwise could result in EAS messages for the same CAP alert that would not be detected as duplicates, resulting in multiple interruptions to broadcasters. As the FCC has reiterated, as recently as January 2010, EAS will exist for the foreseeable future[3], we must take EAS rules into account.

2) For a given CAP message, generate the same alert text, allowing display of the same video crawl during broadcast, and use the same input to Text-to-Speech generation (if supported), as other vendor's CAP/EAS devices. This allows originators to know what the public will see and hear for a CAP initiated EAS activation, and allows origination software to display accurate preview information before an alert is sent.

## 3.2  EAS Alert Activations

An EAS activation of a test or an alert is for all practical purposes an encoding of data, speech, and sound into the audio domain. Public broadcasts of EAS audio comprises the core element of the EAS transmission system, allowing a branching tree of EAS encoders and decoders to propagate alerts. This branching graph is often referred to as the EAS "daisy-chain". The audio alert consists of up to four elements:

1) A header code. **All** EAS activations will include a header code data burst. The header code will be sent three times, with a one-second pause after each transmission, to ensure proper reception by EAS devices.

2) An attention signal.  Following the header code, a two-tone attention signal is used to alert listeners and viewers that EAS activation has occurred and that a message will follow.  The attention signal should be used if, and only if, a message will be included as part of the alert.

3) A message.  The FCC specifies that the message portion may be audio, video, or text. In practice, neither text nor video is actually embedded into the audio signal. Video and text accompany video broadcasts of EAS alert audio, but these elements are not part of the audio encoding of EAS, and are not

---

[2]      The full name is indicated in [4].  Please see the Validation Criteria section below for an overview of [4]

[3]      "… it is likely that the existing EAS will continue to function as a critical alerting system for the foreseeable future", Second Further Notice of Proposed Rule Making, FCC 10-11, released January 14, 2010.

propagated through the "daisy chain" architecture of EAS decoding receivers. So for purposes of this document, the message portion is an audio message only. The audio message, when present, follows the attention signal. EAS encoder/decoders handle attention signal and audio message insertion during an EAS activation.

4) An end of message code. **All** EAS activations will conclude with an end-of-message code data burst. The end-of- message code will be sent three times, with at least a one-second pause after each transmission, to ensure proper reception by EAS devices.

Properly crafted CAP messages can provide the data elements needed to construct these four parts of an EAS alert. Thus CAP provides an alternative method for distributing EAS alerts into the EAS system outside of the traditional EAS "daisy-chain". And since CAP can provide extra descriptive details that cannot be encoded into an EAS audio alert, these details can in theory be available at the point of reception to enable not only triggering of the EAS system, but also for broadcast from this point.

Figure 1 below shows the general processing steps and flow of data during CAP to EAS translation.

Valid CAP ? ◇ —N→ (ERR)

<msgType>="Cancel"? ◇ —Y→ [ Cancel message(s) in <references> ] → (No EAS)

<msgType>="Alert" or "Update"? ◇ —N→ (ERR)

<code>=IPAWSv1.0? ◇ —N→ (Enable non-IPAWS defaults)

Valid IPAWS Profile (required elements present)? ◇ —N→ (ERR)

<scope>="public"? ◇ —N→ (ERR)

<status>="Actual"? ◇ —N→ [ Should log "Test", MAY log others ] → (No EAS)

<eventcode> with valuename SAME and three characters? ◇ —N→ (ERR)

At least one <geocode> with valuename SAME (IPAWS) or other acceptable type (not IPAWS)? ◇ —N→ (ERR)

<expires> - <sent> >= 0? ◇ —N→ (ERR)

<msgType>="Update"? ◇ —Y→ [ Cancel message(s) in <references> ]

Assemble originator, event code. Assemble EAS location codes in the order received. Determine TTTT (duration) value from <sent> and <expires>, rounding up to next highest Part 11.31(c) interval). Construct Alert Text. Fetch audio file, if present, timing out as required. If no audio is present or fetch timed out, if supported, generate audio with Text to Speech from Alert Text. Construct EAS header, and pass to EAS system for processing. Log and send <msgType>=Ack as needed.

( EAS )

(ERR) ERR: Does not result in the generation of an EAS message. MAY log details. MAY return <msgType>=Error as needed by the delivery network.

(No EAS) No EAS: Does not result in the generation of an EAS message. MAY log details. MAY return <msgType>=Ack as needed by the delivery network.

Canceling messages is described in the document text.

Figure 1. General CAP-to-EAS Processing

## *3.3 General Processing Rules*

### 3.3.1 Multiple Parameters

When there are multiple occurrences of a parameters element with the same valueName, and the valueName is not meant to describe a list of items, then recipients SHALL accept the value in the first occurrence of the item only. An example would be multiple occurrences of the EAS-Must-Carry parameter.

## *3.4 Constructing an EAS Header Code from CAP IPAWS v1.0 Profile*

### 3.4.1 EAS Header and CAP IPAWS v1.0 Profile

Refer to 47 CFR 11.31 [3]. for details on the EAS header.

IPAWS CAP v1.0 Profile elements will be used in the construction of the EAS Header as follows.

#### 3.4.1.1 ORG (Originator)

The EAS Originator Code (ORG) SHALL be included in the <value> element of a CAP <info><parameter> block with a <valueName> of "EAS-ORG". Only those originator codes defined in the 2002 update to Part 11 are permitted[4]:

Originator Codes are specified in Part 11.31(d) [3]., as follows.

> **PEP** - Primary Entry Point System
> **EAS** - Broadcast station or cable system
> **WXR** - National Weather Service
> **CIV** - Civil authorities

#### 3.4.1.2 EEE (Event code)

The EAS Event Code (EEE) SHALL be represented using the CAP <info><eventCode> element with a <valueName> of "SAME."

The EEE <value>, such as CAE or CEM, is case sensitive.

The EEE code SHALL be passed to the EAS processing element of a CAP/EAS system, even if the EEE code is not one defined by Part 11. The EAS element of the CAP/EAS system may make a separate determination on whether or not to air the alert in the EAS domain.

A CAP message without a SAME event code SHALL not be aired.

---

[4]    The EAN ORG code (not the EAN event code) was removed as a valid originator code in a 2002 update to EAS, and new equipment manufactured after 2004 does not originate it. However, users were not required to update their systems, and some may still generate an ORG code of EAN. As the CAP profile is a post-2002 environment, EAN ORG is no longer defined for those systems, and should not be used.

**Version 1.0**

### 3.4.1.3 PSSCCC (Location Code)

Each EAS Location Code (PSSCCC) SHALL be included in the <value> element of a separate CAP <area><geocode> element with a <valueName> of "SAME."

This <value> is understood to be the 6-digit EAS/SAME Location Code, as defined in FCC Part 11.31.(c) [3].

The geocodes SHALL be placed into the EAS ZCZC string. At least one <geocode> must be present, and only the first 31 geocodes SHALL be placed in the order that they are encountered in the CAP message. The ordering preservation is required to allow duplicate EAS messages to be detected by direct comparison of the ZCZC string. EAS only allows up to 31 codes in the ZCZC string.

A new definition for location code "000000" can be found in [5].
A location code consisting of all zeros ("000000") shall indicate a message intended for the entire United States and Territories. The "000000" FIPS code was not (and as of this writing, is not) a part of the Part 11 specification. Not all EAS equipment in the field recognizes this code. While a CAP converter implementation, or an All-In-One CAP/EAS device, can use the 000000 code, the action taken by a legacy EAS device receiving such a FIPS code varies from vendor to vendor.

### 3.4.1.4 TTTT (Duration)

The EAS Duration (TTTT) SHALL be calculated as the interval between the times in the CAP <info><expires> element and the CAP <sent> element. The times in these elements SHALL be interpreted as being represented in the International Organization for Standardization (ISO) 8601 format per the OASIS CAP 1.2 specification.

If the calculated interval does not conform to one of the intervals permitted for the "TTTT" parameter in FCC Part 11.31(c)., the interval shall be rounded to the next highest permitted interval up to 99 hours, 30 minutes.

If the interval between <sent> and <expires> elements is less than or equal to 45 minutes and greater than 0 the valid range permitted for EAS Duration shall be 0015, 0030, or 0045. If the interval is less than or equal to 0 then the message SHALL be considered expired and SHALL be ignored.

If the interval between <sent> and <expires> elements is greater than one hour, the valid range permitted for EAS Duration shall be in half-hour increments from 0100 to 9930.

### 3.4.1.5 JJJHHMM (Time)

The EAS Time Alert Issued (JJJHHMM) SHALL be represented using the CAP <alert><sent> element in the ISO 8601 format per the OASIS CAP 1.2 specification.

### 3.4.1.6 LLLLLLLL (EAS Station ID)

The EAS Station ID (LLLLLLLL) is always inserted by the EAS device during EAS activation, and is thus not specified by any element of the CAP message. When a CAP to EAS device transmits an EAS message the contents of the Station ID SHOULD be the call sign of the CAP to EAS device.

### 3.4.1.7 Governors Must Carry

Although the Governors "Must Carry" information is not reflected in any EAS field, the CAP/EAS device must air a message so marked in accordance with FCC 11.55. A "Must Carry" message only overrides the

device Originator and Event Code filtering for automatic forwarding. Local device Location Code filters, duplicate alert prevention, and the alert duration limit will still apply.

Messages for which the Governor's "must carry" authority is invoked SHALL be marked by the inclusion of an additional CAP <info><parameter> block with a <valueName> of "EAS-Must-Carry" and a <value> of "True."

## 3.5 CAP EAS Audio from CAP IPAWS v1.0 Profile

### 3.5.1 Using or constructing EAS Audio during a CAP-to-EAS alert activation

During a CAP-to-EAS alert activation, an EAS Audio message will be used or constructed as follows:

1) If attached audio with a CAP <resource><resourceDesc> element value of "EAS Broadcast Content" is present, the EAS device SHALL use the referenced EAS recorded or streaming audio as the audio portion of the EAS alert.

2) If attached EAS audio is not present, and the EAS device supports text-to-speech technology, then text-to-speech audio SHALL be rendered as described in the "Constructing Text-to-Speech Audio from CAP IPAWS v1.0 Profile" section below and used as the audio portion of the EAS alert.

3) If none of the CAP elements required to construct a text-to-speech audio message as outlined in Figure 2 are present, the expanded EAS message SHALL be used as the text, and rendered as text-to-speech.

4) If there is no attached EAS audio, and the device does not support text-to-speech, the alert SHALL be sent as EAS-codes-only with no audio.

5) If an EAS Audio Uniform Resource Locator (URL) cannot be accessed in a reasonable amount of time, then text-to-speech audio SHALL be rendered as described in the "Constructing Text-to-Speech Audio" section below and used as the audio portion of the EAS alert. If the device does not support text-to-speech, the alert SHALL be sent as EAS-codes-only with no audio. The individual device user will decide what value to enter into the reasonable-amount-of-time value in that particular device.

6) Multiple <resource> elements MAY be present in an <info> block. Multiple resource blocks with a <resourceDesc> of "EAS Broadcast Content" MAY be present in an <info> block, with each accompanied by a unique <mimeType>. If more than one is present, for example, to provide the audio in alternate formats, the audio content SHOULD be the same. The device may choose the format that meets its needs, however, only the content of one resource SHALL be rendered by the EAS device. If multiple <resource> blocks with <resourceDesc> of "EAS Broadcast Content " are present, and the associated <mimeType> value is not different, then the first encountered block SHALL be recognized. If the data referenced by the first suitable URI cannot be obtained in a reasonable time (as defined below), the EAS device WILL proceed with text-to-speech rendering (if supported), and will not attempt to access other resource URIs.

7) If an audio attachment cannot be downloaded within two minutes, or if an audio stream cannot be started within 30 seconds, the device will start the alert with TTS processing.
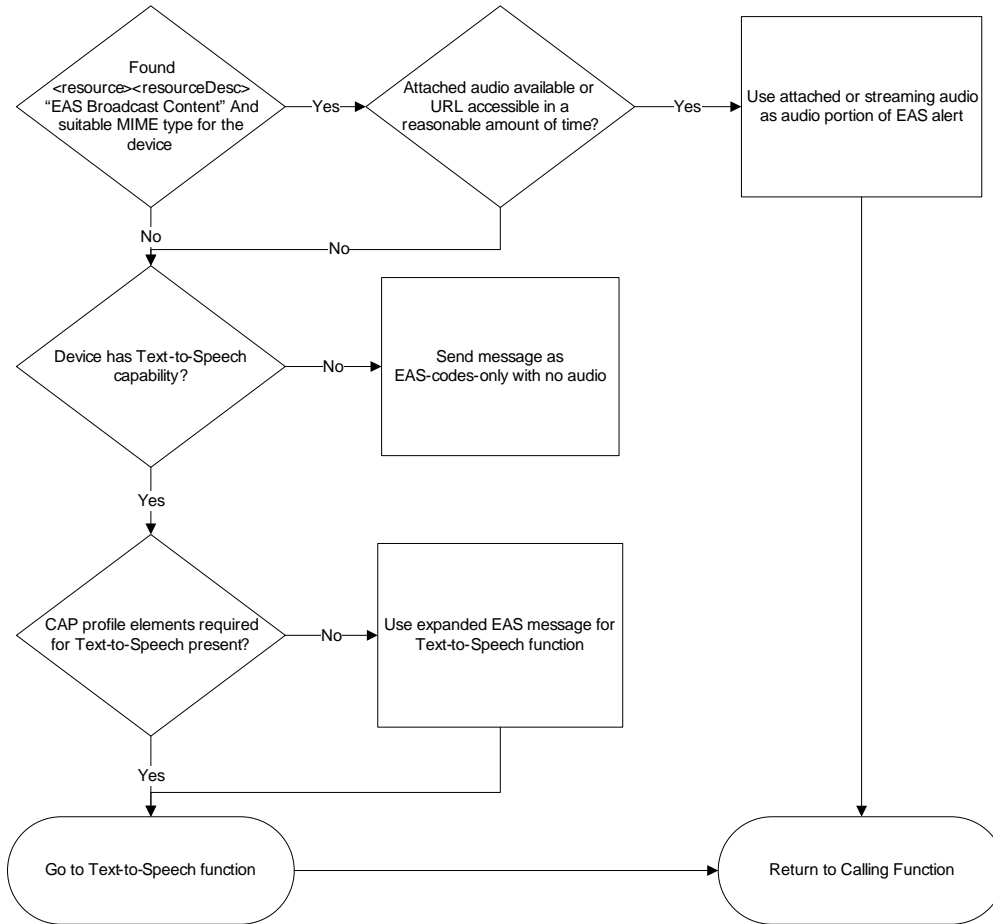
Figure 2 - Audio EAS Processing

## 3.5.2 Constructing EAS Recorded Audio from CAP V1.2 IPAWS v1.0 Profile

Ideally, originators of EAS compatible CAP alert messages will provide the audio portion of the message. Where a recorded audio message intended for EAS use accompanies the CAP message in a CAP <resource> block, the EAS recorded audio message is constructed as follows (see Figure 3):

1) The audio SHALL be encoded as an MP3 file as mono, 64 kbit/s data, preferably sampled at 22.05 kHz or otherwise at 44.1 kHz, or as a WAV PCM file as mono, 16-bit, sampled at 22.05 kHz.

2) The CAP <resourceDesc> element value SHALL be "EAS Broadcast Content" as specified by the CAP IPAWS v1.0 Profile.

3) The CAP <mimeType> element value identifies the file format of the content as specified by [5]. The defined mimeTypes do not specify the codec or container format. The EAS rendering device must determine the content of a file by inspection. ECIG strongly recommends that new mimeTypes be added to the profile to resolve audio format ambiguity, by appending –wav or –mp3 to the end of the defined mime types.

4) A message MAY include a video resource, but it MUST also include a resource with an audio format. Alerts without an audio format resource will have audio generated by Text-to-Speech or no audio, if the CAP/EAS device does not support Text-to-Speech.

5) The CAP <uri> element must be used to identify the location of the file on a network, or on a local file system.

6) Support for the <derefUri> element is NOT required for CAP/EAS devices.

7) The audio SHOULD be a reading of the same text used for the alert text display. It is a recommended practice that the recorded audio message match the alert text display message. Details on the construction of the alert text message are provided in a following section.

8) The FCC Part 11 two-minute limit on EAS audio messages MUST be enforced for all alerts except the EAN alert.  This requirement will place constraints on the speed and cadence used by the speaker to create the recording.  In the case of prepared or streaming audio for the EAN, the resulting audio may exceed two minutes.

9) If the text used for the recording has been shortened from the full original CAP text, as indicated in the text by an ellipsis style insertion of three asterisks ("***") such a deletion SHALL be indicated by a one-second pause immediately following the shortened section of text.
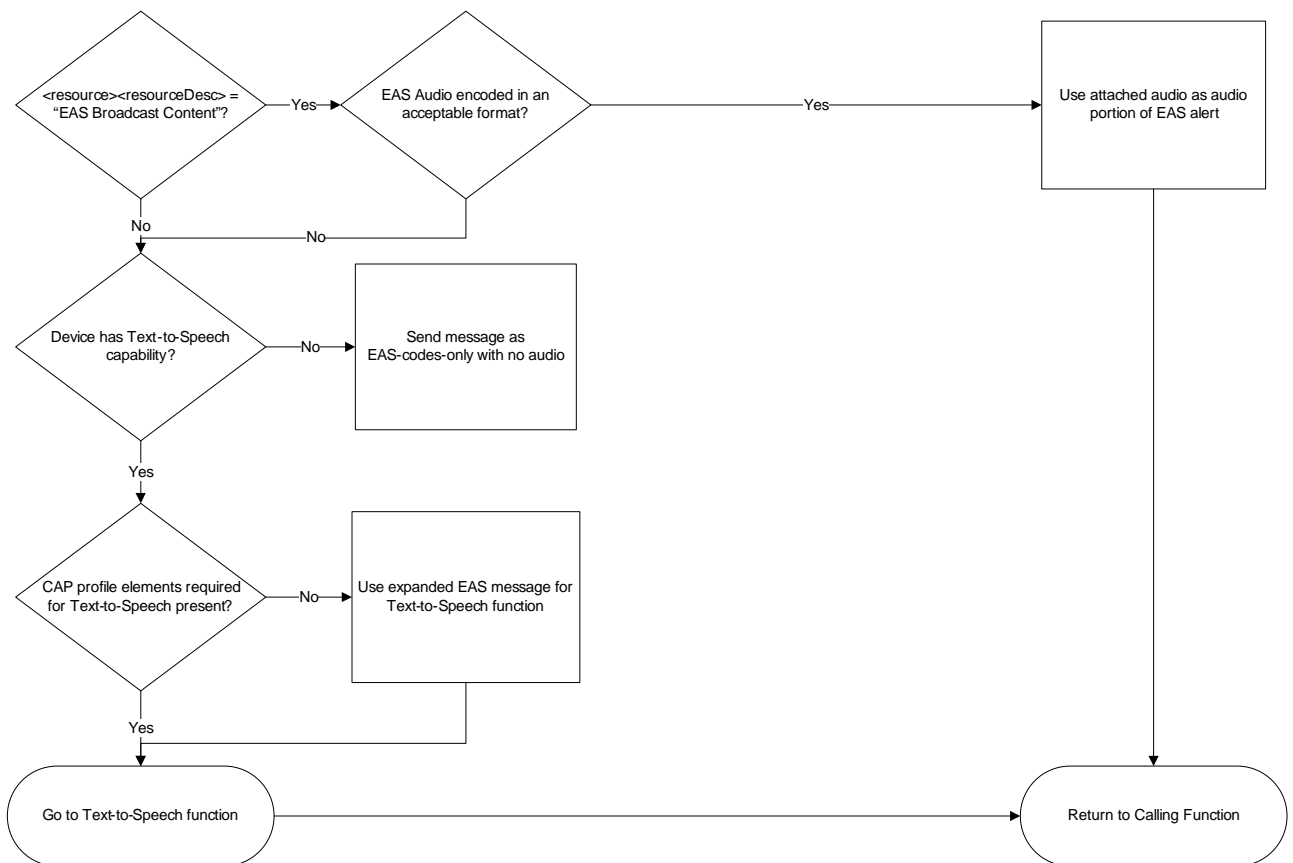
Figure 3:  EAS Recorded Audio Processing

## 3.5.3 Constructing EAS Streaming Audio from CAP V1.2 IPAWS v1.0 Profile

Where a streaming audio message intended for EAS use accompanies the CAP message in a CAP <resource> block, such as for an EAS EAN message, the EAS streaming audio message is constructed as follows (see Figure 4):

1) As required by the IPAWS profile, the CAP <resourceDesc> element value SHALL be "EAS Broadcast Content."

2) The audio SHALL use one of the following streaming methods:

   a.MP3 streaming as either HTTP progressive-download streaming, or

   b.HTTP streaming MP3 server.

Note:  because of the possibility that a particular device may not be able to access the streaming server the originator SHOULD provide text information sufficient to tell the listener where to get additional information, even if, as is the case with a real-time streaming alert, a complete transcript of the information is not available.  Although the streaming audio time for an EAN is not limited, the text length limitations, and therefore the Text-to-Speech length, are still constrained.

Figure 4: Streaming Audio EAS Processing

## 3.5.4 Constructing Text-to-Speech from the CAP V1.2 IPAWS v1.0 Profile

Where the CAP message is to be converted to audio using text-to-speech technology the delivered message SHALL consist of an exact translation of the Alert Text.

Whenever the text included from the CAP elements has been shortened from the full original text, as indicated in the text by an asterisk ellipsis ("***") such a deletion SHALL be indicated by a one-second pause immediately following the shortened section of text.
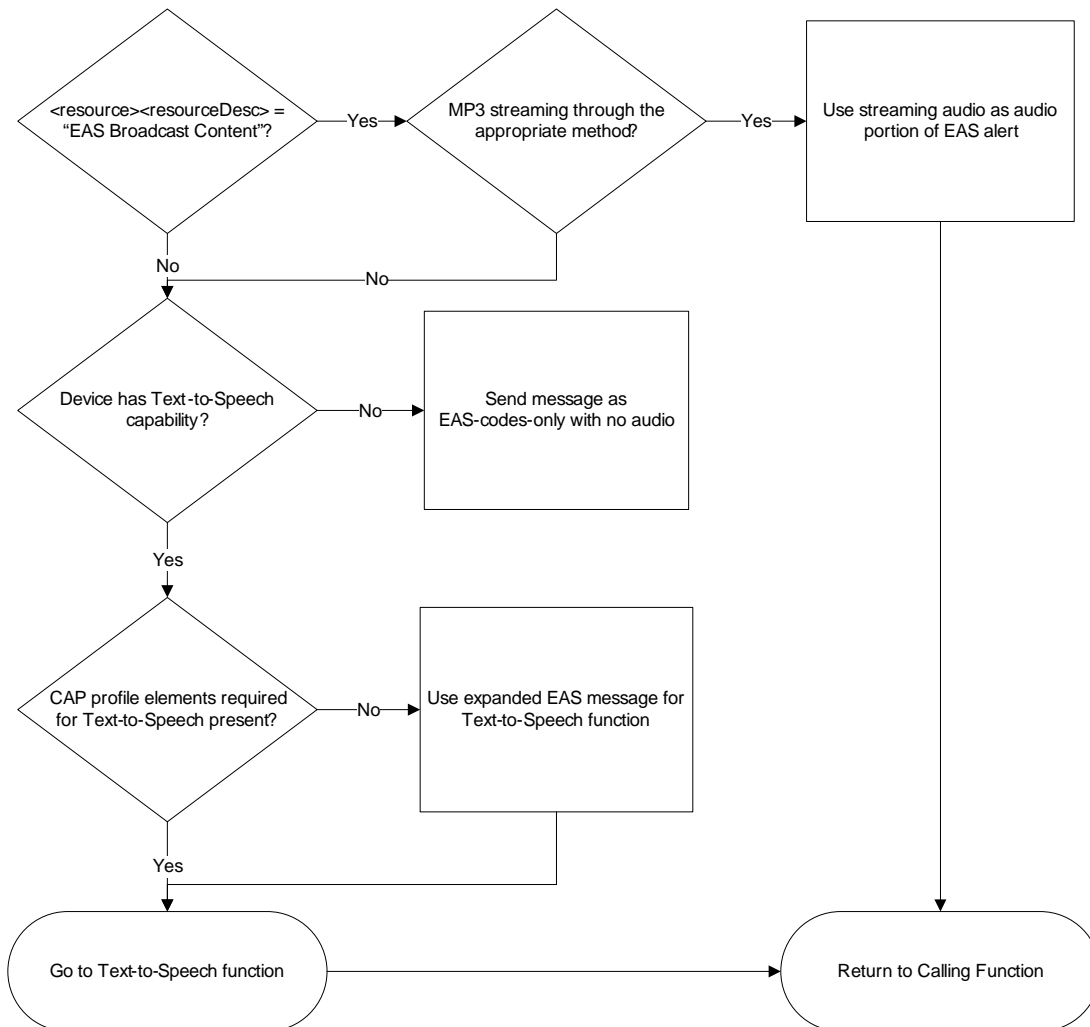
The FCC Part 11 two-minute limit on EAS audio messages will be enforced for all except the EAN alert. This requirement will place constraints on the parameters used to tune the audio results text-to-speech system. In the case of text-to-speech translation for the EAN alert, which is only used in the case that live or streaming audio is unavailable, the resulting audio may exceed two minutes, but the text length limits are still in effect, constraining the ultimate length of the audio.

## 3.6  Constructing Alert Text from CAP V1.2  IPAWS v1.0 Profile for EAS activations

A CAP message contains many free form text elements, many of them optional.  The CAP-to-EAS device must pull these various elements together and generate one text string for use in displays, logs, video crawl, and as a source for Text-to-Speech generation, if needed by the alert, and supported by the device.  The maximum length of this text has been set to 1800 characters. This was chosen based on various requirements, which are primarily the buffer limitations in character generators and other display devices, and the two minute audio time limit for EAS messages.

The section below describes a method for constructing the alert display text. Also defined is a single explicit element that will provide the needed text in a single place.

### 3.6.1 White space rule

Before adding a string to the generated text output intended for Text-to-Speech generation (if TTS is supported by the device) or for use by character generators or any other one line scrolling displays, the CAP/EAS device SHALL collapse the string:

    1) Remove leading and trailing whitespace.

    2) Replace all whitespace characters with space, and converting runs of spaces to a single space.

Whitespace includes the following characters: space, form-feed, new line, carriage return, horizontal tab, and vertical tab.

### 3.6.2 EASText element

Messages intended for EAS dissemination MAY include an instance of <parameter> with a <valueName> of "EASText", and a <value> containing free form text limited in length to1800 characters. If this element is present, the EAS receiver SHALL use it as the alert text for the generated Video Crawl, and for Text-to-Speech conversion (if no audio URI is present and a Text-to-Speech device is present).

The originator SHOULD ensure that the content of the audio URI is the same as the text due to regulations that require broadcasters with audio and visual outputs to provide the same information to both outputs.

The originator SHOULD take into account that the text may be the only text displayed to the user, or passed to an announcer as a script, and SHOULD include all important information, and the information required in

the EAS regulations. This information should include the type of event, effected audience and area, expiration time, description, call to action, etc.

## 3.6.3 CAP/EAS Alert Text with the FCC Required Text

Presently, the FCC requires that alert text accompanying EAS alerts must at least consist of "A sentence containing the Originator, Event, Location and the valid time period of the EAS message constructed from the EAS ZCZC Header Code as required in [3] Part 11.51(d) "[referred to herein as the FCC Required Text]. While this requirement is in effect, the CAP messages need to be constructed by Originators in a manner that provides the additional CAP descriptive information without adding redundancy. If the FCC requirement is dropped in the future, then CAP messages SHOULD be constructed to include these relevant details.

## 3.6.4 Alert Text construction details

The outline of the alert text construction is:

> The FCC Required text. This is a sentence containing the Originator, Event, Location and the valid time period of the EAS message constructed from the EAS ZCZC Header Code as required in [3]Part 11.51(d),

> *followed by:*

>> If the <parameter> <valueName> EASText item is present, the <value> of the EASText parameter element.

>> *Otherwise:*

>> *Optional:* If <senderName> is present, add the phrase "Message from", and the full or partial text of the CAP <senderName> element, *followed by:*

>> The full or partial text of the CAP <description> element; *followed by:*

>> The full or partial text of the CAP <instruction> element.

Whenever the text included from the CAP <description> or <instruction> elements is shorter than the full original text, any deletion SHALL be indicated by an asterisk ellipsis ("***").

There SHALL be an absolute maximum of the first 1800 characters rendered from the combination of all of the above elements.  See below for the details of using partial text from the CAP <description> and/or <instruction> elements. This is enough space for an effective alerting message, but it is incumbent upon CAP message originators to author both effective and size efficient alert text.

The following sub-sections describe the individual parts.

### 3.6.4.1  The FCC Required text

The FCC Required text sentence SHALL be constructed directly from the EAS ZCZC header string.  This header string is specified by the FCC Rules Part 11 and is also defined above.  The header string is generated from parsing the CAP message and applying the CAP/EAS Profile.  The CAP/EAS Profile insures that the same ZCZC string will be produced across vendors and platforms.  This regularity will thus also produce the most consistent text across platforms. The FCC Required Text will, at a minimum, include a translation of the following:

The ORG (EAS Originator) code;
The EEE (EAS Event) code;
A listing of all of the PSSCCC (Location) codes;
The valid time period of the alert event;

The FCC Required Text may be dropped as a requirement in the future. At that time the same kind of information would be presumably included within the other CAP fields.

### 3.6.4.2  Sender (optional)

The information contained in the CAP <senderName> element is useful to identify the specific originator of the alert.  This field is more specific than the generic EAS ORG or the limited 8 character Station ID code.  This is an optional CAP element and may not exist. Printing the sender name is optional.

### 3.6.4.3  Descriptive text

The information contained in the CAP <description> and <instruction> elements contain the specific details needed to make the alert truly informative to the public.  There are other elements that could also be considered, such as <headline>, <areaDesc>, and <event>. But given that there is character limit imposed on the alert text message, and that these elements carry mostly redundant information (<areaDesc> could prove to be a notable exception but the information in an <areaDesc> element SHOULD be placed by the CAP originator in the <description> element for inclusion in the alert text), weight is given to the displaying the values of the <description> and <instruction> elements. The <headline> element is likely to be redundant considering the inclusion of the FCC Required text. Given the text must start with the FCC Required text, use of a headline is inconsistent with its intention of being an introductory announcement.

### 3.6.4.4  Maximum character size enforcement

The limit for the text display is 1800 characters. This includes the FCC Required text string and the Sender. Obviously, the amount of space left available after rendering the FCC Required text will vary in every instance of alert text construction.  If the combined size of the <description> and <instruction> elements exceeds (1800 minus Size of FCC Required text) then partial inclusion of either or both the values of the <description> and <instruction> elements will be required.  Here is an algorithm for computing the allocation of space for these two elements:

# Start by allowing half of the available character space to <description> and half
to <instruction>.
half = (1800 - (length of Required Text + Sender)) / 2

if length of <description> < half:

```
    # Shorten allowance for <description> and allocate excess to <instruction>.
    max_length_description = length of <description>
    max_length_instruction = half + (half - max_length_description)

   else:
    max_length_description = half

   if length of <instruction> < half:
    # Shorten allowance for <instruction> and allocate excess to <description>.
    max_length_instruction = length of <instruction>

    max_length_description = half + (half - max_length_instruction)
   else:
    max_length_instruction = half
```
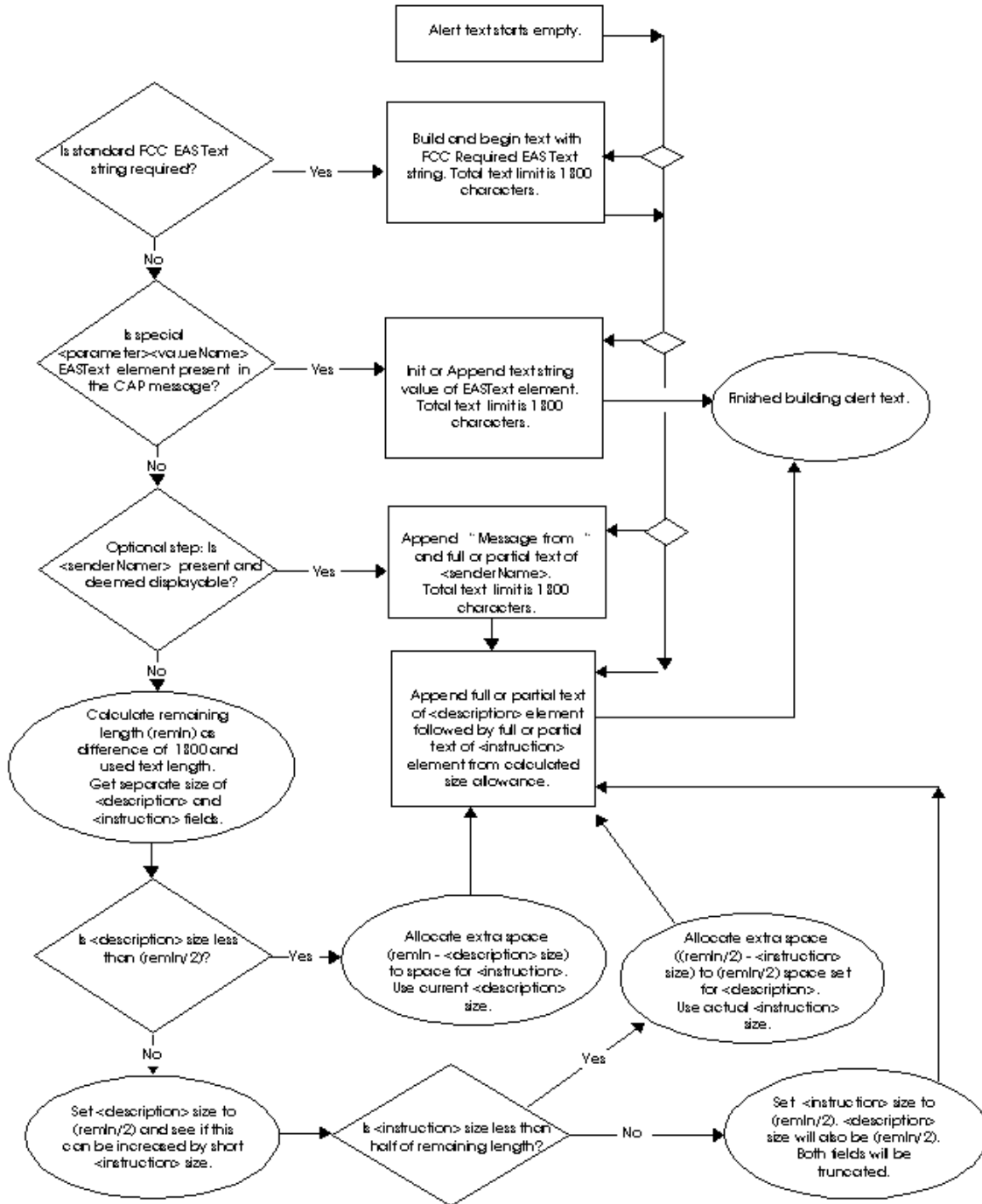
**Version 1.0**



Figure 5: EAS Alert Text Processing

## *3.7 Languages*

FCC part 11 states that logging of EAS messages SHALL be in the primary language of the EAS Participant. It states that in all other cases, the language of announcements "may be in the primary language of the EAS Participant". Regulators, however, continue to explore support for multiple languages. To assist in the use of multiple languages with the EAS system, we offer the following guidelines, rules, and comments.

A CAP-to-EAS device SHALL provide for the specification of a primary language. That language need not be English. A CAP-to-EAS device MAY offer one or more secondary languages.

Rules for the CAP message contents:

1) When multiple languages are available in a CAP message intended to render to EAS, multiple <info> blocks SHALL be used.

2) Each <info> block SHOULD contain the language element; the default "en-US" SHALL be used if language is null or not present.

3) If an <info> block provides an audio resource, it SHOULD be in the language of the <info> block.

4) If multiple <info> blocks in the same language are present, only the first such block is processed.

5) Each <info> block MUST refer to the same alert, and MUST contain the same content, in the coded fields, such as, <category>, <responseType>, <urgency>, <severity>, etc. The <info> block MUST contain the same information in the text elements, in the appropriate language of the <info> block.

Rules for rendering the CAP message:

1) If the CAP-to-EAS device is set for a primary language only:

a. Use the first <info> block that matches the primary language. If no such block is present, then use the first block with a language of en-US (explicitly or by default). Lack of a language block in the desired primary language does not remove the obligation of an EAS participant to relay a required alert, such as EAN, EAT, RMT, a message marked as Governors Must Carry, or other alerts designated as required by the FCC in the future (such as the National Periodic Test under discussion in 2010).

b. Generate the Alert Text from the elements of this <info> block. Use the audio from the first resource in a suitable format from this <info> block.

c. If suitable audio is not present, then use Text to Speech in the primary language, if supported by the CAP-to-EAS device. If Text to Speech in the primary language is not supported, then if the primary language is not en-US, use the audio from the first <info> block with language en-US (explicit or by default), either from the resource, or from Text to Speech if supported.

2) If the CAP-to-EAS device is set to provide a primary language and one or more secondary languages:

a. Process the first <info> block that matches the primary languages, and the first <info> block that matches each of the desired secondary languages. If no primary or secondary language <info> blocks are present, then select the first block with a language of en-US (explicitly or by default). Lack of a language block in the desired primary or secondary languages does not remove the obligation of an EAS participant to relay a required alert, such as EAN, EAT, RMT, a message marked as Governors Must Carry, or other alerts designated as required by the FCC in the future (such as the National Periodic Test under discussion in 2010).

b. Generate the Alert Text strings from the selected <info> blocks. The total length of 1800 characters may be used, with truncation as necessary, however, if the CAP-to-EAS device is interfaced to equipment that CAN render more than 1800 characters, then a longer string MAY

be used, allowing the complete content of all desired languages to be crawled. The CAP-to-EAS device can run one long crawl, or several smaller crawls, as desired. Each language, however, MUST be truncated to 1800 characters.

c. Generate audio as follows. Use the first suitable audio resource from each of the selected <info> blocks. If an <info> block does not contain a suitable audio resource, generate Text to Speech audio for that language, if supported. If no audio can be generated from any selected <info> blocks, but audio can be generated from the first block with language en-US, use this audio. If the total length of the generated audio is less than 120 seconds, then use the audio as the EAS alert audio. If the total length of the generated audio is greater than 120 seconds, then:

> i. Play the primary audio message, truncated to 120 seconds, followed by the normal EAS End of Message data.

> ii. Then play the contents of the other audio messages, each truncated at 120 seconds, until all selected languages have been played.

The intent of the above rules is to:

1) Provide for a non-English primary language, while still requiring English to be used for required alerts if the desired primary language is not present.

2) Allow for longer crawls containing all desired languages, if supported by the crawl hardware/software.

3) Allow for audio messages longer than 120 seconds total by placing some of the languages after the end of the EAS portion of the alert. Note that each language is still limited to 120 seconds, and the Part 11 rules are still maintained, but the station audience can still receive an unlimited number of multilingual messages.

4) Each CAP message will still generate only one EAS message. The audio content of the EAS message could be different as each station broadcasts the message. State plans should (and already do) take this into account, and have EAS participants only monitor other stations that broadcast in their primary language.

It is ECIG's recommendation that the originator of the message provide text in all of the major languages used by a local area. Many EAS participants are automated and unattended during at least some portion of the day – human aided translation at the station is not practical, and machine translation is not reliable enough for precise emergency instructions.

## 3.8   CAP/EAS msgType handling

### 3.8.1 Alert
The message is always processed.

### 3.8.2 Update
The CAP/EAS device MUST remove the referenced message from the air queue, if it has not already aired.

The CAP/EAS device MAY halt a message that is in progress.  If the message is halted, an EAS End of Message MUST be sent if any EAS headers have been sent.  If the message is halted, it MUST immediately be followed by the Update message.  This is to avoid the problems that can occur if the public hears a partial message.

The Update message is processed in the normal way for air.

**Version 1.0**

Note: There is no "minor change" parameter as there is in some profiles. Updates to EAS alerts should be used with caution as they may cause an airing of an alert that has already been sent once, for a field that does not affect the audio or alert text of the message.

Originators should assume, however, that no matter how soon after the original alert an update is issued, the original alert may be broadcast to the public.

### 3.8.3 Cancel

The CAP/EAS device SHOULD log the Cancel message.

The CAP/EAS device MUST NOT attempt any new deliveries of the cancelled message:

> 1) If the message is not in the process of being delivered, do not deliver the message.

> 2) If the message is in the process of being delivered, complete the delivery normally. In no case may an in-progress EAS alert audio announcement be preempted and halted by a Cancel message. In particular, if an EAS header has been aired, the corresponding EAS EOM MUST be aired.

> 3) If the message is being delivered sequentially to several stations, complete any message in progress to particular station, but do not deliver the message to any other stations.

The CAP/EAS device MAY halt the video display for message that has been aired.

An <info> block is optional with a Cancel message. The CAP/EAS device will not process any <info> block and will not air an EAS alert from a Cancel message. The EAS system was not designed to support Cancellation messages.

As with the Update <msgType>, the originator can make no assumptions regarding what might happen at a particular broadcaster. No matter how soon a cancel is issued, the original alert may be broadcast to the public.

### 3.8.4 Ack and Error

A CAP/EAS device is not required to process received Ack or Error messages. It is not required to send an Ack or Error message. The CAP/EAS device MAY send such messages, as determined by the particular distribution system in use.

## 3.9 Test messages

There are two types of test messages. In the EAS domain, stations commonly put "test" messages on the air, and are in fact required to do so in the case of the Required Monthly Test (RMT).

In the CAP domain, there is a way of sending "test" alerts, with a <status> of "test". The natural inclination of CAP originators is to send the RMT event with status=test. These are viewed by the CAP/EAS system as a CAP test, and the alert is NOT placed on the air. Specifically, EAS/CAP devices may receive messages with a "test" <status>, but those messages will NOT be forwarded for purposes of EAS activation (on air display). Similarly, messages with "exercise" or "draft" <status> will NOT be forwarded for purposes of EAS activation.

Therefore, for purposes of EAS activation, EAS test messages (RMT and RWT) must have a <status> of "ACTUAL". RMT messages – the only EAS test message to commonly go over the air – must have an

"ACTUAL" <status> to do so. To avoid confusion in the EAS domain, we have chosen not to give RMT (and the other EAS test codes, such as RWT, DMO, NPT, NMN) a special status by deviating from the <status> element of "ACTUAL". To reach the public, i.e. to go over the air, the status MUST be "ACTUAL".

To avoid confusion in the CAP domain, we recommend that originators use the following CAP fields for EAS on air tests:

> *CAP <status> element <value> of Actual.*
> *CAP <urgency> element <value> of Unknown.*
> *CAP <severity> element <value> of Minor.*
> *CAP <certainty> element <value> of Unknown.*

If a CAP/EAS device does receive a message with <status>=TEST, it MUST NOT place that alert on the air. It MAY log it, but MUST mark it as a test, so that there is no confusion with a live alert. Such a test alert SHOULD NOT be sent to other attached automatic devices in such a way that there can be any possibility that the test message will be treated as an actual alert.

## 3.10 Standards for older CAP protocol versions.

This document describes the requirements and actions of a CAP/EAS device when handling [4]and [5] messages. During the transition from older versions of the protocol to this version, a CAP/EAS device may need to handle older protocols.

Wherever possible, the rules established in this document should be applied to older protocols as well. If an EAS message is generated, the rules for handling those elements that are present in the older protocol as defined here SHOULD be followed.

In addition,

1)When processing CAP 1.1 messages, CAP/EAS devices SHOULD assume a value of CIV as an originator code if one is not provided in the CAP message.

2)A <geocode> with a <valueName> of FIPS6 SHOULD be accepted and handled as a <geocode> with a <valueName> of SAME.

## 3.11 Reception Of An Alert in Both the CAP And The EAS Domain

An EAS participant's CAP to EAS system SHOULD avoid sending duplicate messages in the EAS domain. An EAS device is already constrained by [3] Part 11.33(a)(10) "Duplicate messages must not be relayed automatically". Additional complications arise if an alert is received in both the CAP and the EAS domains. [5]

Definitions of duplicate messages:

1) If a CAP message has the same <identifier>, <sender>, and <sent> elements, it is a duplicate in the CAP domain. *Note: The <identifier> field is not sufficiently specified to be unique across the universe of CAP originators. It is specified to be unique on any one CAP origination system. Thus the requirement that a CAP processing system SHOULD use the above three fields.*

---

[5]      This is based on the actions of some legacy devices, and some interpretations of Part 11. ECIG believes this is a best course of action. This implementation guide also requires building the ZCZC string from the <geocode> elements in the order the <geocode> elements are present in the CAP message.

2) If an EAS message is identical to another EAS message, as determined by a byte-wise comparison of the ZCZC strings (not including the LLLLLLLL field), it is a duplicate message in the EAS domain. Note that two messages with the same locations in different orders are different messages.

3) If the EAS message generated by a CAP message is identical to the EAS message generated by another CAP message, or by a message received in the EAS domain, then that CAP message is a duplicate in the EAS domain.

> a.It is possible to have two CAP messages that are not CAP duplicates generate two EAS messages that are duplicates.

> b.If the CAP component and the EAS component of a CAP-to-EAS system are loosely coupled, it is still the responsibility of the system to not automatically relay duplicate EAS messages.

Handling duplicate messages:

1) If duplicate CAP messages are received, and neither has yet been processed, the CAP-to-EAS device may choose either one to process, optionally performing an ACK or ERROR response to either or both as needed. The CAP system SHALL only render one of them to EAS.

2) Once a CAP message has been rendered to EAS, if the resulting EAS message is a duplicate EAS message, and the duplicate has not yet aired, then the CAP-to-EAS system can choose either one to automatically air, but not both. The system is free to choose whichever it believes is the better alert. The system is free to optionally allow an operator to determine which is best. Only one of the duplicate alerts SHALL be automatically placed on the air.

3) Once an EAS message has been aired, subsequent duplicate EAS alerts (originally received from CAP or direct from EAS) SHALL NOT be automatically aired by the system. The system may optionally allow a live operator to select and air a duplicate alert, however, such a duplicate alert MUST be sent with an EAS header that is a duplicate – allowing downstream EAS stations to properly detect the message as a duplicate.

Note: If a CAP-to-EAS device receives an alert in the EAS domain, and it has a duplicate alert that has been received via CAP, but neither has yet aired, it SHOULD use the CAP version of the alert. The assumption is that the CAP alert will have better quality audio and significantly more detailed text. A CAP message may not always be better, however, especially if the attached audio cannot be fetched due to transport problems. In that case, the EAS version may be preferred because it may contain the original audio, voiced by a human. As stated above, the CAP-to-EAS system, possibly in conjunction with a live operator, can make its own determination of which is better, but it MUST not automatically air both. We also recommend against using the text from a CAP message and the audio from the EAS message – because of the nature of EAS, it is not possible to absolutely guarantee that an EAS domain duplicate is a true duplicate.

# 4  Notes for Originators and Origination Software

Originators of CAP alerts that will trigger the EAS system must provide all the information required for use within the IPAWS system and must create compliant CAP messages. This is defined by [4] [5], and the Implementation Guide.  Items of particular significance are discussed below.

1) The EAS-ORG parameter MUST be provided.

2) A SAME event code MUST be provided.

3) At least one <geocode> with value name of SAME MUST be provided.  Only the first 31 geocodes will be used for the EAS alert. Other geocodes with other value names MAY be provided, but CAP/EAS messages will only use the SAME values to determine if an alert will be aired.

4) EAS Devices may modify the expiration times of the CAP message by rounding up to the nearest valid EAS duration.

5) The EASText parameter MAY be provided, which will define the alert text used for video crawls and Text-to-Speech.  Otherwise, a combination of the contents of the event code, the geocodes, the sent and expired times, the <description>, <instruction>, and <sender> will be used to generate the video crawl and Text-to-Speech content.

6) The value of the <areaDesc> element is ignored. Specific location and area details should be included in the <description> in order to become part of the alert text at the CAP-to-EAS receiver.

7) The total length of the text message MUST be no more than 1800 characters.  More characters will result in truncated alert text. Text to Speech audio will be truncated to 120 seconds.

8) Audio content MAY be provided in a resource with one of the IPAWS mime types and the appropriate <resourceDesc>.  Audio will be truncated to 120 seconds, except in the special case of the EAN event type.  Audio may be provided in WAV or MP3 format, with other sample rate and bit rate restrictions as provided in the profile.  Use of MP3 over WAV is recommended to provide good quality audio at a low bit rate.

9) EAS messages will be aired only if the scope is Public.

10) EAS messages will be aired only if the status is Actual.  Note that some EAS event types are for testing use, including RMT, RWT, DMO, NPT, and NMN.  Even though these alerts are notionally "test" alerts, EAS messages will only go to air if the status is "Actual", for example, if a CAP system is to generate a Required Monthly Test in an area, the status must be Actual.  To avoid other CAP users from treating an RMT as an actual event, we recommend that these elements be used:

> CAP <status> element <value> of Actual.
> CAP <urgency> element <value> of Unknown.
> CAP <severity> element <value> of Minor.
> CAP <certainty> element <value> of Unknown.

11) A CAP/EAS device will process the following <msgType>s for air:

> Alert,  Update,  and  Cancel

If the "Alert" message has not yet aired, the Update and the Cancel message will air in its place, however, there is no way to guarantee that the Update or Cancel will be processed before the original "Alert" message has already gone to air.

# 5 CAP/EAS Examples of the CAP V1.2 IPAWS v1.0 Profile

## 5.1 Anatomy of an EAS compatible CAP Alert - Hazardous Materials Warning

Key: Violet: CAP 1.2 and ECIG EAS-CAP required, Red: CAP 1.2 required and ECIG EAS-CAP optional or not used, Blue: CAP 1.2 optional but ECIG EAS-CAP required, Dk Yellow: CAP 1.2/ECIG EAS-CAP conditionally required, Green: optional for both

| | |
|---|---|
| `<?xml version="1.0" encoding="UTF-8"?>` | <- Standard xml header |
| `<alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">` | <- The required alert tag with attributes |
| `<identifier>EASCAP-14-20090311173400</identifier>` | <- Unique CAP message identifier> |
| `<sender>testcap.com@100.0.0.101</sender>` | <-CAP message sender s name |
| `<sent>2009-03-11T17:34:00-6:00</sent>` | <-sent time value. This encodes the start time of the alert, |
| `<status>Actual</status>` | <-CAP message status. See CAP 1.2 reference. |
| `<msgType>Alert</msgType>` | <-CAP message type. See CAP 1.2 reference. |
| `<source>EASAUTH</source>` | <-source sender. See CAP 1.2 reference. |
| `<scope>Public</scope>` | <-scope of alert. See CAP 1.2 reference. |
| `<code>IPAWSv1.0</code>` | <-IPAWS compliant CAP message |
| `<info>` | <- start of single info block |
| `<event>HAZARDOUS MATERIALS WARNING</event>` | <- Event name. Textual label naming the alert |
| `<category>Safety</category>` | <- Event category. See CAP 1.2 reference |
| `<urgency>Immediate</urgency>` | <- Event urgency. See CAP 1.2 reference |
| `<severity>Severe</severity>` | <- Event severity. See CAP 1.2 reference |
| `<certainty>Unknown</certainty>` | <- Event certainty. See CAP 1.2 reference |
| `<audience>All</audience>` | <- Event audience. See CAP 1.2 reference |
| `<senderName>CAP alert central</senderName>` | <- Name of sender. |
| `<expires>2009-03-11T18:34:00-6:00</expires>` | <- Expiration time of the alert. For non-IPAWS, if not provided then it is defaulted to be 1 hour after <sent> time. |
| `<parameter>` | <- Special parameter, unique to EAS CAP messages, to specify the EAS ORG code. Required for IPAWS compliance. For non-IPAWS, if not provided, may default  EAS ORG code to CIV. |
| `<valueName>EAS-ORG</valueName>` | |
| `<value>CIV</value>` | |
| `</parameter>` | |
| `<eventCode>` | <- Alert event code to identify type of alert. |
| `<valueName>SAME</valueName>` | <- the valueName field allows any encoding scheme. SAME is the only scheme compatible with EAS. |
| `<value>HMW</value>` | |
| `</eventCode>` | <- Start of area block. Can have multiple geocode blocks. |
| `<area>` | |

**Version 1.0**

| | |
|---|---|
|        `<areaDesc>`Downtown Washington, DC and District of Columbia`</areaDesc>` | <- Specific Textual description of alert area ignored |
|        `<geocode>` | |
|        `<valueName>`SAME`</valueName>` | <- geocode blocks. Each geocode defines one location. CAP-EAS requires SAME type FIPS codes. |
|        `<value>`011001`</value>` | |
|        `</geocode>` | |
|   `</area>` | |
|   `<resource>` | <- start of resource block for audio message |
|    `<resourceDesc>`EAS Broadcast Content | <- resource description name |
|    `</resourceDesc>` | |
|    `<mimeType>`audio/x-ipaws-audio `</mimeType>` | <- mimeType to identify resource file format |
|    `<uri>`http://100.0.0.101/EASCAP-14-20090311173400.mp3`</uri>` | <- location of audio file on network |
|   `</resource>` | |

**Version 1.0**

| | |
|---|---|
| &lt;headline&gt;Hydrochloric Acid Leak Hazard Emergency&lt;/headline&gt; | <- headline element . This is a short headline style announcement for the alert. This should be compelling and very brief. Details are provided in the &lt;description&gt; and &lt;instruction&gt; fields. Not used by the ECIG profile. |
| &lt;description&gt; A dangerous chemical spill has created a hazard potentially threatenening downtown Washington,DC and areas immediately south of downtown from 10:45AM until at least 11:45AM. A train derailment at 10:40AM, 1 mile south of the Capitol, has resulted in a large hydrochloric acid leak. A northerly breeze will disperse some volatile hydrogen chloride gas towards downtown Washington,DC and all areas of the capitol within 10 minutes. Crews are working now to neutralize the acid and quickly mitigate the hazard. &lt;/description&gt; | <- description of the alert<br><br>This description provides the essential details about where the alert is, what it is and who is affected.<br><br>This has 78 words and 513 letters. |
| &lt;instruction&gt;Liquid hydrochloric acid releases toxic hydrogen chloride gas fumes. This gas is extremely irritating to the lungs and has a sharp and very irritating odor. All people south of the capitol and south of downtown Washington, DC within 1/2 mile if the railroad track, should evacuate street areas by walking steadily to the north immediately. Seek fresh air and place a dripping wet cloth over your mouth to breathe. Affected areas should be safe within one hour as the acid is neutralized and the gas disperses. Copious amounts of water can be sprayed in the air to reduce the immediate hazard. Stay tuned for further information.<br><br>&lt;/instruction&gt; | <- instruction for the public concerning the alert<br><br>This section is designed to provide instructions to the public for eliciting a rational response and reaction to the alert.<br><br>This is example is somewhat lengthy for broadcast but is to the point and provides the most immediate advice to those citizens in the area. It would translate via a text-to-speech engine quite well.<br><br>This has 107 words and 633 letters.<br><br>The amount of text is well within the limits of EAS broadcast systems.<br><br>The total text from the three informational fields is under 1200 characters and 200 words. |
| &lt;/info&gt;<br><br>&lt;/alert&gt; | <- end of info block<br><br>< end of CAP alert |

**Translation Notes:**

Using Implementation Guide recommendations, this CAP alert is translated into the following EAS header for the EAS audio activation:

Header = ZCZC-CIV-HMW-011001+0100-0702334-LLLLLLLL–

Note that the LLLLLLL station ID derivation is open. ECIG recommends using a string, up to eight characters long, assigned to the CAP to EAS translator. This is the only part of the header string that can be variable among different implementations of translators.

The CAP message translates into the following alert text:

> A CIVIL AUTHORITY HAS ISSUED A HAZARDOUS MATERIALS WARNING FOR THE FOLLOWING COUNTIES/AREAS: District of Columbia, DC; AT 5:34 PM ON MAR 11, 2009 EFFECTIVE UNTIL 6:34 PM. Message from CAP alert central. A dangerous chemical spill has created a hazard potentially threatening downtown Washington, DC and areas immediately south of downtown from 10:45AM until at least 11:45AM. A train derailment at 10:40AM, 1 mile south of the Capitol, has resulted in a large hydrochloric acid

leak. A northerly breeze will disperse some volatile hydrogen chloride gas towards downtown Washington, DC and all areas of the capitol within 10 minutes. Crews are working now to neutralize the acid and quickly mitigate the hazard. Liquid hydrochloric acid releases toxic hydrogen chloride gas fumes. This gas is extremely irritating to the lungs and has a sharp and very irritating odor. All people south of the capitol and south of downtown Washington, DC within 1/2 mile if the railroad track, should evacuate street areas by walking steadily to the north immediately . Seek fresh air and place a dripping wet cloth over your mouth to breathe. Affected areas should be safe within one hour as the acid is neutralized and the gas disperses. Copious amounts of water  can be sprayed in the air to reduce the immediate hazard. Stay tuned for further information.

This text could be sent to a text crawl, scroll, or paging device for broadcast. This text consists of 218 words and 1350 characters. As one can see, use of this many words provides plenty of room for informative alerting. Limiting alert information to 1800 characters is a realistic goal.

Below is a description of the exact assembly formula used.

1. Automatic translation of the FCC Part 11 so called "ZCZC"EAS warning string.

*"A CIVIL AUTHORITY HAS ISSUED A HAZARDOUS MATERIALS WARNING FOR THE FOLLOWING COUNTIES/AREAS: District of Columbia, DC; AT 5:34 PM ON MAR 11, 2009 EFFECTIVE UNTIL 6:34 PM."*

It is presumed that until the FCC rules otherwise, this style of automatic translation must still be included in the broadcast of the alert. This style of translation is not without it's benefit. The style provides a consistent format and serves as a useful introduction to the alert information that follows. The negative aspect of this statement is if it is redundant to other information taken from the CAP alert.

2. A sentence auto-constructed from the <senderName> element.

*"Message from 'CAP alert central.'"*

3.The contents of the <description> element.

*"A dangerous  chemical  spill has created a hazard potentially threatening downtown Washington,DC and areas immediately south ...."*

4.The contents of the <instruction> element.

*"Liquid hydrochloric acid releases toxic hydrogen chloride gas fumes. This gas is extremely irritating to the lungs..."*

Note that the space allocation algorithm did not have to be used since the size of both the <description> and <instruction> text could fit in the space remaining after using the FCC Required text and the <senderName> field. The size of the FCC Required text and the <senderName> is 205 characters. This left almost 1600 characters for the descriptive text. Note that usually there are a few more county codes in an alert, so this example is a shorter than average. But even another 200 characters allocated to the Required string would still allow for 1400 characters of descriptive text.

**Other comments regarding text elements:**

It is interesting to note that the informative elements of <description> and <instruction> are all optional elements. The minimally required elements are only those needed to create a basic compliant EAS message. The cost of omission of the descriptive elements would be the lost opportunity for providing better alert details at the CAP-EAS translation node. *Note that the EAS downstream daisy chain activations will only receive the standard EAS header information. None of the enhanced descriptive information at the CAP reception node can be inserted into the EAS FSK audio transmission stream by using the basic standard EAS transmission method.*

**Audio Notes**:

This particular CAP example illustrates the use of an audio resource to provide the EAS alert audio voice track. The example shows the <mimeType> element that indicates that the file is an MPEG MP3 file, and the <uri> element that gives the location of the alert on a network. The receiver of this CAP message can attempt to download this audio file for play out as part of the EAS alert. Other CAP messages could reference other types of audio, such as WAV files, or streaming audio such as streaming Mpeg . If no audio resource is given, the recommendation describes using the translated text as input to a text-to-speech engine in order to create the EAS audio voice track.

## *5.2 Hypothetical Test Alert: Required Monthly Test*

Monthly tests are a required part of testing of the Emergency Alert System. The IPAWS CAP network could be used to activate Required Monthly Tests. Here is an example.

```
<?xml version="1.0" encoding="UTF-8"?>
<alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
<identifier>CAPNET-100-20100125130000</identifier>
<sender>laciv.com@192.168.0.210</sender>
<sent>2010-01-25T13:00:00-6:00</sent>
<status>Actual</status>
<msgType>Alert</msgType>
<source>HSTEC</source>
<scope>Public</scope>
<code>IPAWSv1.0</code>
<info>
  <event>EAS Monthly Test </event>
  <category>Safety</category>
  <urgency>Unknown</urgency>
  <severity>Minor</severity>
  <certainty>Unknown</certainty>
  <audience>All</audience>
  <senderName>Hypothetical Seattle Test Emergency Center</senderName>
  <expires>2010-01-25T14:00:00-6:00</expires>
  <parameter>
    <valueName>EAS-ORG</valueName>
    <value>CIV</value>
  </parameter>
  <eventCode>
    <valueName>SAME</valueName>
    <value>RMT</value>
  </eventCode>
  <area>
    <areaDesc> All of Island, Jefferson, Kitsap, King, Pierce, and Snohomish Counties, Washington</areaDesc>
    <geocode>
      <valueName>SAME</valueName>
      <value>053029</value>
    </geocode>
    <geocode>
      <valueName>SAME</valueName>
      <value>053031</value>
    </geocode>
    <geocode>
      <valueName>SAME</valueName>
```

```
      <value>053035</value>
   </geocode>
   <geocode>
      <valueName>SAME</valueName>
      <value>053033</value>
   </geocode>
   <geocode>
      <valueName>SAME</valueName>
      <value>053061</value>
   </geocode>
  </area>
  <headline>Required Monthly Test</headline>
  <description>This is a coordinated Monthly Test of the integrated CAP/EAS Alert system. This is only a test. Had this been a
real alert, important information would have followed. This is only a test.</description>
 <resource>
      <resourceDesc>EAS Broadcast Content</resourceDesc>
      <mimeType>audio/x-ipaws-audio </mimeType>
      <uri>http://100.0.0.111/EAS/EASaudios.wav</uri>
   </resource>
   </info>
</alert>
```

This demonstrates an actual Monthly Test of the Emergency Alert System injected via the CAP network. It is important to note that this is an actual test alert that is meant to be broadcast by EAS participants. It is not just an internal, hidden test of the CAP / EAS infrastructure. This explains why the value of the CAP <status> element is Actual rather than Test.

This CAP message translates into the following EAS header string :

 ZCZC-CIV-RMT-053029-053031-053035-053033-053061+0100-0252000-LLLLLLLL-

## *5.3 Hypothetical National Alert Notification:*

CAP alerts can also be used to announce the EAS National Emergency alerts.

```
<?xml version="1.0" encoding="UTF-8"?>
<alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
<identifier>CAPNET-69-20090315165600</identifier>
<sender>natexample@example.com</sender>
<sent>2009-03-15T16:56:00-6:00</sent>
<status>Actual</status>
<msgType>Alert</msgType>
<source>DEMO</source>
<scope>Public</scope>
<code>IPAWSv1.0</code>
<info>
  <event>NATIONAL EMERGENCY ACTION NOTIFICATION</event>
  <category>Safety</category>
  <urgency>Immediate</urgency>
  <severity>Extreme</severity>
  <certainty>Unknown</certainty>
  <audience>All</audience>
  <senderName>DEMO</senderName>
  <expires>2009-03-20T16:56:00-6:00</expires>
  <parameter>
    <valueName>EAS-ORG</valueName>
    <value>PEP</value>
  </parameter>
  <eventCode>
    <valueName>SAME</valueName>
    <value>EAN</value>
  </eventCode>
  <area>
    <areaDesc>United States</areaDesc>
    <geocode>
      <valueName>SAME</valueName>
      <value>000000</value>
    </geocode>
  </area>
  <headline>National Emergency Action Notification Announcement</headline>
  <description>A state of national  emergency has been declared for the United States. Listen for an important live
announcement.</description>
  <instruction>Stay tuned for further instructions.</instruction>
  <resource>
    <resourceDesc>EAS Broadcast Content</resourceDesc>
    <mimeType>audio/x-ipaws-streaming- audio</mimeType>
    <uri>http://100.0.0.111:8000/liveeas.mp3</uri>
  </resource>
  </info>
</alert>
```

This CAP message translates into the following EAS header string :

 ZCZC-PEP-EAN-000000+9930-0742256-LLLLLLLL-

A CAP alert announcing the dire circumstances of a National Emergency would for the most part look like any other CAP alert. The descriptive text in this example is left minimized to reduce clutter. An actual national alert message may or may not include important details in the descriptive text elements. But the earlier above examples suffice to demonstrate the use and utility of the relevant descriptive CAP elements.

**Version 1.0**

The audio resource can have a very important difference in a National Alert. The EAN and EAT National alerts are designed to broadcast live (they can of course still be pre-recorded audio) from the White House to the American public. A CAP alert can reference a sightly delayed, progressively downloaded live audio stream carrying this alert message. The audio stream SHOULD be able to start from the beginning in order that none of the important message be lost. The example shows how an audio resource could be constructed to provide this reference.

Further EAN CAP alert updates can be sent later as details emerge and develop. The EAS system would automatically forward these alerts and the associated live audio.

## *5.4 Hypothetical National Alert Termination:*

A National Emergency Action Notification would hopefully be followed eventually by a termination of the emergency. A new CAP alert could be used to announce the national emergency termination.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
<identifier>CAPNET-70-20090316160000</identifier>
<sender>natexample@example.com</sender>
<sent>2009-03-16T16:00:00-6:00</sent>
<status>Actual</status>
<msgType>Alert</msgType>
<source>DEMO</source>
<scope>Public</scope>
<code>IPAWSv1.0</code>
<info>
  <event>NATIONAL EMERGENCY ACTION TERMINATION</event>
  <category>Safety</category>
  <urgency>Immediate</urgency>
  <severity>Extreme</severity>
  <certainty>Unknown</certainty>
  <audience>All</audience>
  <senderName>DEMO</senderName>
  <expires>2009-03-16T16:26:00-6:00</expires>
  <parameter>
    <valueName>EAS-ORG</valueName>
    <value>PEP</value>
  </parameter>
  <eventCode>
    <valueName>SAME</valueName>
    <value>EAT</value>
  </eventCode>
  <area>
     <areaDesc>United States</areaDesc>
     <geocode>
       <valueName>SAME</valueName>
       <value>000000</value>
     </geocode>
  </area>
  <headline>National Emergency Action Termination Announcement</headline>
  <description>The national  state of emergency has ended. Here is an important live  announcement.</description>
  <instruction>Stay tuned for further instructions.</instruction>
  <resource>
    <resourceDesc>EAS Broadcast Content</resourceDesc>
    <mimeType>audio/x-ipaws-streaming-audio</mimeType>
    <uri>http://100.0.0.111:8000/liveeas.mp3</uri>
  </resource>
  </info>
</alert>
```

This CAP message translates into the following EAS header string :

 ZCZC-PEP-EAT-000000+0030-0752200-LLLLLLLL-

**Version 1.0**

## *5.5    Test CAP/EAS message for the CAP IPAWS v1.0 profile*

Test messages may be sent from CAP originators into the CAP/EAS translator nodes. See Section 3.9 for a discussion of CAP test messages. Here is an example:

```
<?xml version="1.0" encoding="UTF-8"?>
<alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
<identifier>CAPNET-101-20100126130000</identifier>
<sender>laciv.com@192.168.0.210</sender>
<sent>2010-01-26T13:00:00-6:00</sent>
<status>Test</status>
<msgType>Alert</msgType>
<source>HSTEC</source>
<scope>Public</scope>
<code>IPAWSv1.0</code>
<info>
   <event>CAP System Test </event>
   <category>Safety</category>
   <urgency>Unknown</urgency>
   <severity>Minor</severity>
   <certainty>Unknown</certainty>
   <audience>All</audience>
   <senderName>Hypothetical Seattle Test Emergency Center</senderName>
   <expires>2010-01-26T14:00:00-6:00</expires>
    <eventCode>
      <valueName>SAME</valueName>
      <value>ADR</value>
   </eventCode>
<parameter>
      <valueName>EAS-ORG</valueName>
      <value>CIV</value>
   </parameter>
   <area>
      <areaDesc> Island County, Washington</areaDesc>
      <geocode>
         <valueName>SAME</valueName>
         <value>053029</value>
      </geocode>
   </area>
   <headline>CAP/EAS Internal System Test</headline>
   <description>This is an internal system test of the integrated CAP/EAS Alert system. This test message is not meant to be
broadcast. This is only a system test.</description>
   </info>
</alert>
```

This demonstrates an internal system Test of the CAP/Emergency Alert System network. The value of the CAP <status> element determines if the message is Actual or a Test   A  test message is never meant to be broadcast into the EAS system and does not need to generate an EAS header string. Instead, it is intended to test the reception, parsing, validation, and translation of  IPAWS CAP messages in the CAP/EAS reception nodes.  The <eventCode> field can be anything since by definition a Test <status> message MUST NOT be broadcast.  This example includes a SAME eventCode of ADR, the Administrative Message. Missing or non-conforming elements can be used to test CAP/EAS translator nodes. Translator nodes will log Test alerts and include information on the validation of the CAP/EAS message.

# 6 CAP-to-EAS Validation Criteria

Platforms receiving CAP messages intended to activate the EAS system MUST pass the CAP messages through a validation phase before using the message to generate an EAS alert.

## 6.1    Introduction

Incoming CAP messages SHALL be subjected to a validation step prior to acceptance for translation to an FCC Part 11 EAS alert.  The purpose of this step is to determine whether or not to continue the translation based upon basic syntax and semantic requirements.  It is recommended that the EAS-CAP Decoder log any useful information about message validation.

This step does not address message authentication.  The source will be trusted based upon other authentication steps taken in a different layer of the communication.

## 6.2    Validation Philosophy

In this document we discuss the rules for validation of EAS-CAP  messages.  There are assumed rules for basic CAP validation,  "conformance rules" defined by [5], and rules defined by the EAS-CAP Industry Group.

This validation section and the Implementation Guide in general follows the OASIS IPAWS 1.0 profile conformance definitions, but notes a few differences between strict conformance to that profile and reasonable alternatives that may have  application where IPAWS conformance is not required or where IPAWS may choose to change the OASIS recommendations.

## 6.3    Error Signaling Philosophy

We realize that EAS-CAP is a part of the larger CAP community, and that messages that are in error for EAS renderers are not necessarily errors to the CAP community.  Therefore, we have taken the approach  that we will not signal an error unless a message is erroneous with respect to the CAPv1.2 standard..  If the message is in error only to an EAS-CAP  Decoder, we signal acceptance of the message, but do not act on it.  Our intent is that the CAP community is not subjected to what they would consider to be erroneous Error messages.  See the discussion on "EAS-CAP Message Result States" below to see how this is implemented.

The result states optionally involve the generation of a return CAP 1.2 message with a <msgType> element of Error or Ack.  The EAS-CAP Implementation Guide does not mandate the implementation of this facility.  Furthermore, a particular [4] based CAP source may not require or accept these messages.  [4] based CAP servers that accept return messages will allow an EAS-CAP Decoder a ready mechanism to support server side validation of processed alert messages.  If return messages are generated, they SHALL conform to the syntax rules in section B3 – "EAS-CAP Message Result States".  This does not infer that other methods may or may not be used in addition to or instead of the [4] based CAP Ack/Error facility.  This methodology will be reviewed by the EAS-CAP Industry Group before further recommendation.

## 6.4    Validation Overview

The CAP-to-EAS message validation procedure described below details the minimum requirements to enforce basic message verification.  Specifically, the purpose of this validation step is to:

1) reject improperly formatted, improperly constructed, or damaged CAP messages.

2) ignore messages that do not contain sufficient information for the generation of a unique EAS message as defined by [5]and/or by ECIG recommendations.

3) ignore CAP messages that are not intended for EAS translation.

Once a CAP message passes the validation step, it may be subjected to an additional set of filters that will decide if a particular alert is to be placed on the air by a particular user. This step in the process is not further addressed in this document.

The EAS-CAP validation procedure gives the order of the validation steps. The intent of the entire EAS-CAP Implementation Guide is to ensure that any EAS-CAP Decoder will respond to a CAP message in the same manner– in the rendering of the message as well as error signaling. The validation order is an important part of that process.

## 6.4.1 CAP Required Elements

In the EAS-CAP Implementation Guide, we do NOT require that all CAP-required elements be present. We assume that a processing element in the chain before the EAS-CAP Decoder has verified the format of the alert, and that the authentication scheme has delivered an intact message to the EAS-CAP Decoder.

Specific CAP message elements are defined by [4]as required, as shown in BOLD in Figure 6 below. A minimum subset of these elements is applicable to EAS translation, as indicated by "**" in Figure 6 below. Not all CAP required elements are relevant to EAS translation in the manner prescribed by FCC Part 11. Therefore, the validation does <u>not</u> base this step upon strict adherence of a CAP message, based upon CAP required elements, to the CAP standard (though device certification may require it.) This guide requires that any element that <u>is</u> needed by the EAS-CAP Implementation Guide is valid <u>if</u> it is present.

## 6.4.2 EAS-CAP Required Elements

In order to translate a CAP message into an EAS message, a small set of optional CAP elements are required. These elements have been defined in the EAS-CAP Implementation Guide in order to guarantee consistent translation into an EAS message. These elements of the CAP message are not necessarily required as elements in CAP, but are required by EAS (eg. <info>). Some elements are required for proper translation into an EAS message, and thus are included in a specific minimum set of EAS-CAP required elements. Other elements may be considered of lesser importance. Reference [5]defined a slightly larger set of required elements. Most of these elements are matched by the ECIG recommendation. Differences between the OASIS IPAWS profile [5] and ECIG recommendations are noted in the discussions that follow.

If any of the minimum set of Required EAS compatible CAP elements are present, they are examined for validity; if any are invalid, the message is in error. If the elements are missing, and a proper EAS alert cannot be generated, the message is ignored. The rationale is that such a message may not be intended for EAS, and therefore, missing EAS elements are not considered an error condition in the non-EAS-CAP community. See the discussion in "EAS-CAP Message Result States" below to see how this is implemented.

An example of a message that is correct based on the CAP schema, but is not correct for the EAS-CAP Implementation Guide, is an Area block that contains a <geocode> with value name of SAME but has a value not matching the format of the [3] based PSSCCC code.

## 6.4.3 Logging

Logging is an implementation detail for each vendor. Logging requirements for CAP messages are not yet defined by the FCC or other certification authorities. It is recommended that an EAS-CAP Decoder SHOULD log all received CAP messages, along with a notation of the CAP message result states, as defined later in this document.
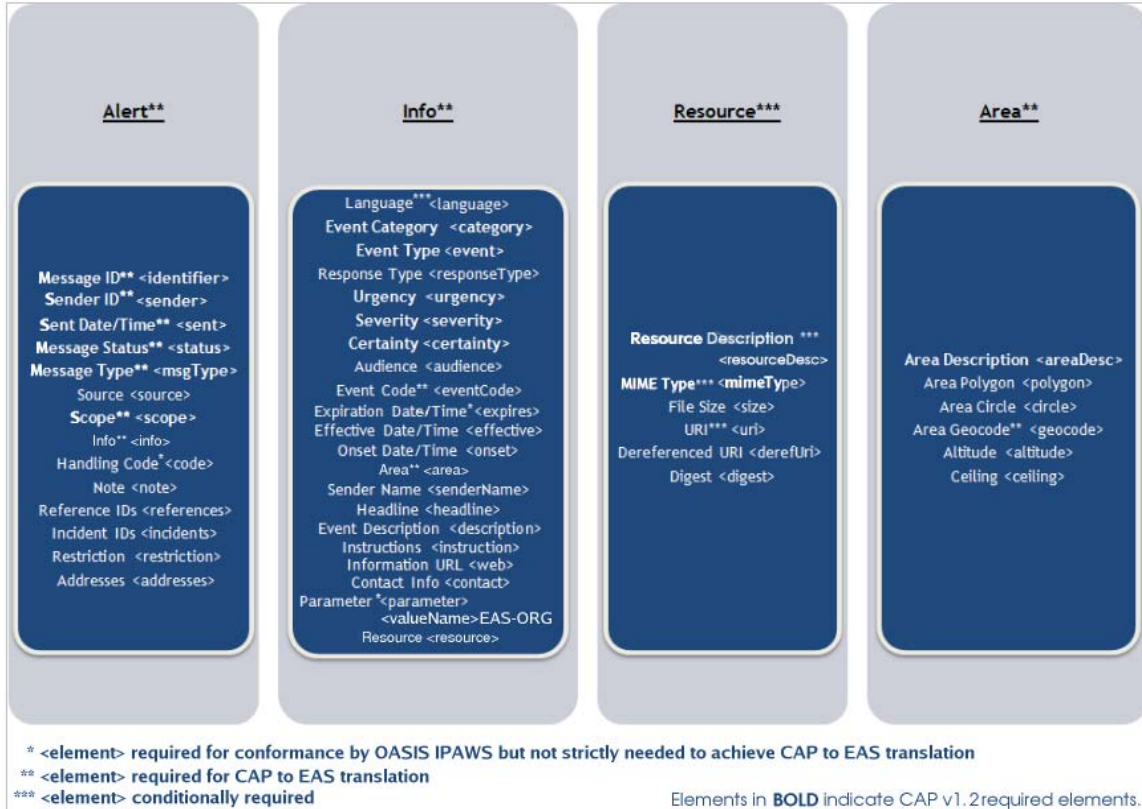


Figure 6: CAP v1.2 Message Structure [4] and EAS-CAP Implementation Guide Required Elements

## *6.5    EAS-CAP Message Validation Procedure*

Each of the following validation steps results in a new message state. The default is that the message is passed to the next verification step. The three states are Rejected, Ignored, or Accepted. The action taken in those states is the following section of this document. For information on validation of specific elements, see the notes column under the "CAP to EAS Validation Table" below.

**Version 1.0**

EAS-CAP validation is performed in the following order:

  1) CAP conformance.

      a.   Check for legal XML format.

      b.   There is no requirement for receivers to validate CAP messages to the CAP schema, so ECIG has recommended that only elements required for translation to EAS be validated. But, there may be other entities that impose message validation requirements on an CAP-EAS device. Check for the presence and validity of ALL CAP elements required by any applicable certification authority or national, state, or local authority.

      c.   If a message fails this step, the message SHALL be Rejected.

  2) CAP / EAS validation:

      a.   *Minimum set of CAP Required elements:* If a CAP element that is required by CAP and is also required by the EAS-CAP Implementation Guide is missing, the message SHALL be Rejected. See Figure 6 above to determine the CAP Required and EAS Required elements.

      b.   *Minimum set of Required EAS compatible CAP elements*: If any of the minimum set of Required EAS compatible CAP elements are present, they are examined for validity, and if any are invalid, the message SHALL be Rejected. Validity in general means that the value is a recognized CAP or EAS-CAP Implementation Guide value. If any of these required elements are missing, the message SHALL be Ignored. Note: A missing optional EAS-CAP element will have a default defined by the guide and is not cause for a Reject or an Ignore.

  3) Acceptance:

     A message that has passed the previous validation steps SHALL be Accepted. Once the message is accepted, in most implementations it will be further subjected to various EAS rendering filters to decide if the alert is to be aired by a particular user. Such filters are in the EAS rendering domain only, and are beyond the scope of this work.
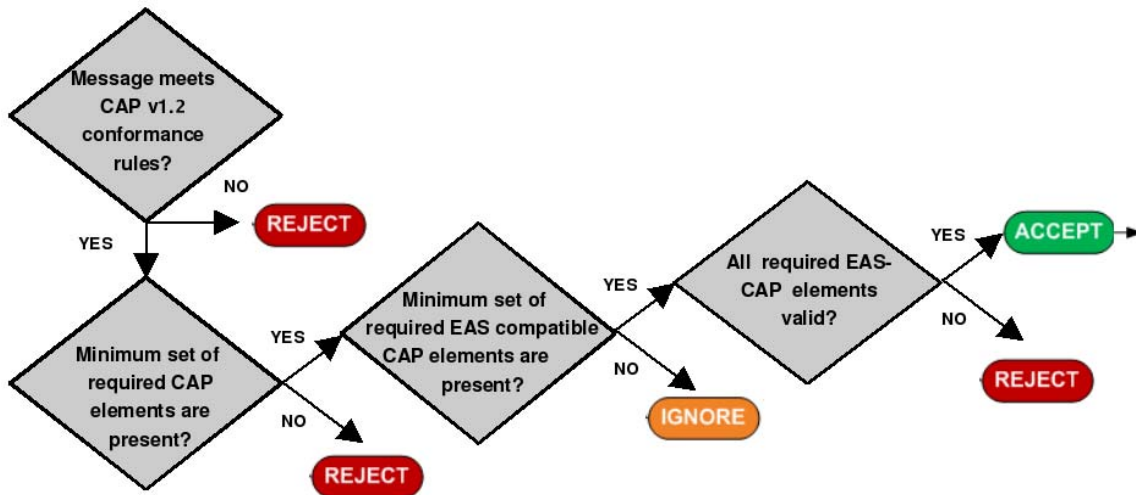


Figure 7: Basic CAP-to-EAS Validation Process

## *6.6 EAS-CAP Message Result States*

Based on the procedure above, the validation steps result in three states, Rejected, Ignored, or Accepted. The resulting actions that MAY be taken are described below. Returning a result provides a valuable mechanism for message validation to the sender, but note that CAP servers are not required to support this option. If the EAS-CAP Decoder does send the optional return message, it SHALL conform to the syntax rules described below. This methodology will be further reviewed by the EAS-CAP Industry Group before further recommendation.

**Rejected**:

> An EAS-CAP Decoder SHALL NOT further process or render a rejected message. It MAY generate a return message and the syntax SHALL be a <msgType> of "Error", a <note> element describing the issue, and a <references> element containing the extended message identifier (in the form *<sender>,<identifier>,<sent>*) of the Rejected message.

**Ignored**:

> An EAS-CAP Decoder SHALL NOT further process or render an ignored message. It MAY generate a return message and the syntax SHALL be a <msgType> of "Ack", a <note> of "Ignored" ("Ignored" MAY be followed by a colon (":") and a text description of the issue), and a <references> element containing the extended message identifier (in the form *<sender>,<identifier>,<sent>*) of the Ignored message.

**Accepted**:

> An EAS-CAP Decoder MAY generate a return message and the syntax SHALL be a <msgType> of "Ack", a <note> of "Accepted", and a <references> element containing the extended message identifier (in the form *<sender>,<identifier>,<sent>*) of the Accepted message.

> If the EAS-CAP Decoder places the alert on the air, it MAY generate an additional return message with a <msgType> of "Ack", a note of "Aired on" followed by the FCC Call Sign(s) of the stations(s) that the alert was sent on, and a <references> element containing the extended message identifier (in the form *<sender>,<identifier>,<sent>*) of the aired message. This may result in multiple "Ack" messages in the case where an EAS-CAP Decoder controls more than one broadcast outlet.

## *6.7   CAP to EAS Required Elements*

Below in summary are the ECIG minimum elements required within a valid EAS-CAP message. If any of these elements is missing, the message translation to EAS SHALL be ignored; if invalid, the message SHALL be rejected.

> <u>\<alert></u> , <u>\<identifier></u> , <u>\<sender></u> , <u>\<sent></u> , <u>\<status></u> , <u>\<msgType></u> , <u>\<scope></u>
>
> <u>\<info></u> , <u>\<eventCode></u>
>
> <u>\<area></u> , <u>\<geocode></u>

Note that an \<info> block can be present or missing when \<alert>\<msgType> is Cancel. Handling such a CAP message does not require CAP translation into EAS, so the \<info> block is irrelevant.

In addition there are two conditional required elements if the optional \<resource> element is used. If any of these elements is missing, the message SHALL be ignored; if invalid, the message SHALL be rejected.

> <u>\<resourceDesc></u> , \<mimeType>, <u>\<uri></u>

The OASIS IPAWS CAP/EAS profile [5] also defines three more elements that must be present in CAP messages for IPAWS conformance. These are \<alert>\<code>, with a specific value that must contain the version string of the IPAWS profile ("IPAWSv1.0"), \<info>\<expires>, and \<info>\<parameter> \<valueName>EAS-ORG. CAP messages that do not contain these elements do not conform to the OASIS IPAWS v1.0 profile. Strict IPAWS conformance requires rejection of CAP / EAS messages that do not contain these extra elements. The ECIG Implementation guide provides a simple method to default these values if IPAWS conformance is not required. See the second table below.
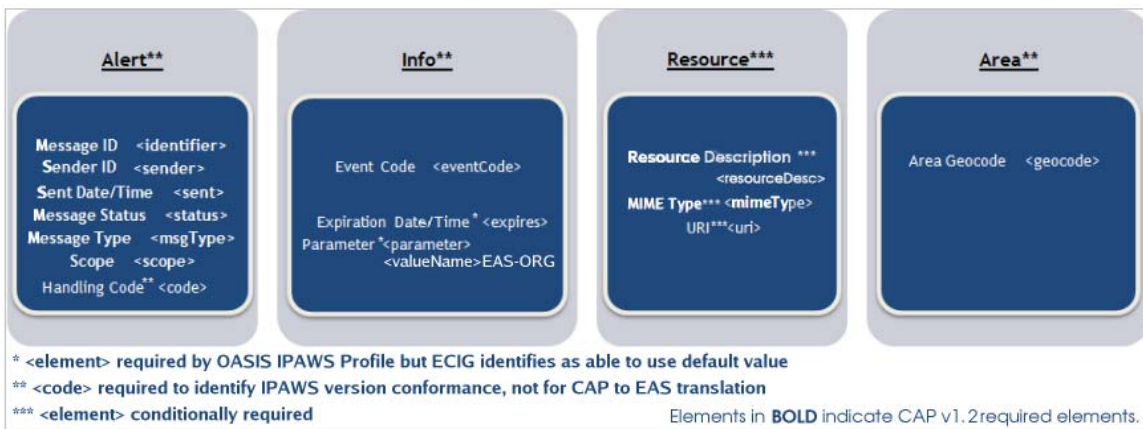


Figure 8: Minimum EAS-CAP Translation Elements

---

**Version 1.0**

## CAP  to EAS Validation Table

R = Required; O = Optional; E = Extension; ND = Not Specifically discussed in IPAWS profile, so subject to CAP constraints; NU = Not Used; U = Used;  C = Conditional

**\*** = Items that map into the EAS ZCZC string.

CAP fields in this table:

> 1) Are in the EAS-CAP validation process
>
> or
>
> 2) Have recommended values meant to be useful to non-EAS user – in particular, those used in conjunction with the various EAS "test" messages.  See the discussion on EAS Test messages elsewhere in this document.

**\*\*** = Items that have non-IPAWS conformance entries in a second table..

| CAP Standard Element Name and definition | CAP 1.2 / OASIS-IPAWS 1.0 Constraint | EAS-CAP I.G. Constraint for IPAWS | CAP to EAS  Mapping and Validation Notes |
|---|---|---|---|
| **Alert Block** | | | |
| <alert><br><br>Identifies XML message as a CAP Standard message. | R/R | R | Must follow CAP defined syntax. Must be version 1.2.<br><br>Example:  <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2"> |
| <identifier><br><br>Each message must contain a number or string uniquely identifying that message. | R/R | R | Recommended that the identifier value be stored as state information for an active CAP message in the EAS-CAP Decoder. Must be used with <sender> and <sent> to match an existing alert during <msgType> Update, Cancel, Ack, or Error. |
| <sender><br><br>Identifies the originator of an alert. Guaranteed by assigner to be unique globally. Can be an email address. | R/R | R | Recommended that the sender value be stored as state information for an active CAP message in the EAS-CAP Decoder. Must be used with <identifier> and <sent> to match an existing alert during <msgType> Update, Cancel, Ack, or Error. |
| <sent>  Sent time.<br><br>Format: "2007-05-24T16:49:00-07:00" = 24 May 2007 at 16:49 PDT | R/R | R | **\***Must be converted to EAS **JJJHHMM** Effective Date/Time. If cannot be converted due to missing time zone or a syntax error then message SHALL be rejected. Must be used with <identifier> and <sender> to match an existing alert during <msgType> Update, Cancel, Ack, or Error. |
| <status><br><br>Alert handling code.<br><br>Possible Values: Actual, Exercise (for participants), System (internal functions), Test (all should ignore), Draft (not actionable). | R/R | R | "Actual" SHALL be used for any alert destined for EAS forwarding  to the public– including all EAS test messages such as RWT, RMT, NPT, DMO, and NMN.<br><br>"Test" may be used to test CAP reception on a CAP to EAS platform.<br><br>Use of the other CAP defined values is not defined yet. |
| <code><br><br>The IPAWS profile version string. | O/R | R | According to [5], the value SHALL include the IPAWS version string. "IPAWSv1.0"is defined as the initial version string value. CAP without a <code> element, or whose code value does not include any defined IPAWS version string, cannot be used as an IPAWS compliant CAP to IPAWS EAS trigger.<br><br>\*\*See table below for non-IPAWS handling. |

**Version 1.0**

| CAP Standard Element Name and definition | CAP 1.2 / OASIS-IPAWS 1.0 Constraint | EAS-CAP I.G. Constraint for IPAWS | CAP to EAS Mapping and Validation Notes |
|---|---|---|---|
| <msgType><br><br>Nature of alert.<br><br>Possible Values: Alert, or Update, Cancel, Ack, Error.<br><br>(The latter four are applied to the alert identified in <references> below, and explained in <note> below.) | R/ND | R | Valid range for values must be "Alert" or "Update", or "Cancel".<br><br>Messages missing <msgType> SHALL be rejected; messages with incorrectly valued <msgType> SHALL be ignored.<br><br>Reference [5] does not discuss this specific element, and therefore does not place any constraint on use of <msgType> values. The presence of this element is REQUIRED by [4], thus can be assumed to be REQUIRED by [5]. |
| <scope><br><br>Intended distribution. Possible Values: Public, Restricted, Private. | R/ND | R | Messages with a value other than Public SHALL be ignored.<br><br>Reference [5] does not place any constraint on use of <scope> values. The presence of this element is REQUIRED by [4]. |
| <references> | O/O | O | Not used for directly for EAS. Used to find earlier CAP messages based on <identifier>,<sender>, and <sent> in order to implement <msgType> Update and Cancel. |
| <info><br><br>CAP and the EAS-CAP Implementation Guide allows multiple Info Blocks to support multiple languages. See below for Info Block elements. | O/O | C | At least one <info> block is Required for translation into EAS. A special case is <msgType> of Cancel, where no <info> block is required and no translation to EAS is needed.<br><br>Multiple <info> blocks may be used to encode alert information in multiple languages. If the same language is defined for multiple <info> blocks, then only the first block SHALL be processed. Data MUST encode data for the same alert.<br><br>See below for Info Block elements. |
| **Info Block** elements | | | Only the information in the first info block will be used. |
| <language><br><br>Code denoting the language the alert is in. CAP assumes "en-US" if blank. | O/ND | C | Usage is required when supporting multiple languages with multiple <info> blocks. |
| <event><br><br>Text denoting type of event of the alert. | R/ND | NU | ECIG does NOT recommend using this field in construction of alert text or other visual display. Reference [5] does not place any constraint on use of <event> values, but the presence of this element is REQUIRED by [4]. |
| <urgency><br><br>Possible values: Immediate, Expected, Future, Past, Unknown | R/ND | NU | For test alerts (RWT, RMT, NPT, DMO, and NMN) value SHOULD be set to *Unknown* by Originator. ECIG CAP to EAS translation does not use this field.<br><br>Reference [5] does not place any constraint on use of <urgency> values, but the presence of this element is REQUIRED by [4]. |

**Version 1.0**

| CAP Standard Element Name and definition | CAP 1.2 / OASIS-IPAWS 1.0 Constraint | EAS-CAP I.G. Constraint for IPAWS | CAP to EAS Mapping and Validation Notes |
|---|---|---|---|
| \<severity\><br><br>Possible values: Extreme, Severe, Moderate, Minor, Unknown. | R/ND | NU | For test alerts (RWT, RMT, NPT, DMO, and NMN) value SHOULD be set to *Minor* by Originator. ECIG CAP to EAS translation does not use this field.<br><br>Reference [5] does not place any constraint on use of \<urgency\> values, but the presence of this element is REQUIRED by [4]. |
| \<certainty\><br><br>Possible values: Observed, Likely, Possible, Unlikely, Unknown. | R/ND | NU | For test alerts (RWT, RMT, NPT, DMO, and NMN) value SHOULD be set to *Unknown* by Originator. ECIG CAP to EAS translation does not use this field.<br><br>Reference [5] does not place any constraint on use of \<certainty\> values, but the presence of this element is REQUIRED by [4]. |
| \<eventCode\><br><br>System-specific code for event.<br><br>Subfields \<valueName\> of SAME and \<value\> define the 3 letter code. | O/R | R | *One and only one eventCode, with a valueName of SAME and a 3 letter value is required. Maps to EAS **EEE** Event Code field. Range is any uppercase alphabetic characters. Depending upon the specific EAS-CAP Decoder implementation, message validation may or may not validate against the FCC defined EAS codes. Provisions for state defined EEE values can be handled optionally.<br><br>Example:<br>  \<eventCode\><br>    \<valueName\>SAME\</valueName\><br>    \<value\>CAE\</value\><br>  \</eventCode\><br><br>If the implementation does not handle the EEE code, the message SHALL be ignored. |
| \<expires\> Expiration time of the information of the alert. | O/R | R | *Used to derive **EAS Valid Time Period (TTTT)** by subtracting from \<sent\> to derive a duration Round the resulting duration up to next valid EAS Duration length. EAS Duration Range: If greater than 0 and less than or equal to 45 minutes, '15,30,45 mins' else every half hour from '1hr' to '99hrs 30 mins'. If duration is less than or equal to 0 then the message is expired and SHALL be ignored.<br><br>Required for IPAWS conformance. **See table below for non-IPAWS handling. |
| \<senderName\> Human-readable name of agency or authority. | O/O | O | ECIG recommends optionally using this value in construction of alert text or other visual display. |
| \<headline\> Direct and actionable brief human-readable headline. | O/O | NU | ECIG does NOT recommend using this field in construction of alert text or other visual display. |
| \<description\> Extended human-readable description of event. | O/O | U | ECIG recommends using this value in construction of alert text or other visual display. |
| \<instruction\> Extended human-readable recommended action for targeted alert recipients. | O/O | U | ECIG recommends using this value in construction of alert text or other visual display. |

**Version 1.0**

| CAP Standard Element Name and definition | CAP 1.2 / OASIS-IPAWS 1.0 Constraint | EAS-CAP I.G. Constraint for IPAWS | CAP to EAS Mapping and Validation Notes |
|---|---|---|---|
| <parameter><br><br>Any system-specific datum associated with alert. | O,E | E | Three <valueName> fields are defined:<br><br>1.**EAS-ORG** *(from [5])*<br>2.**EASText** *(ECIG recommendation)*<br>3.**EAS-Must-Carry** *(from [5])*<br>See below |
| Special EAS parameter.<br><br><parameter><br><valueName> EAS-ORG<br></valueName><br><value> EAS, CIV, WXR, or PEP<br></value> | O,E/O,C,E | R | **\***Maps to 3 letter **EAS ORG** code. Range is:<br><br>EAS, CIV, WXR, or PEP.<br><br>Example :<br><br><parameter><br>    <valueName>EAS-ORG</valueName><br>    <value>CIV</value><br>  Required for IPAWS profile conformance: Messages missing <parameter> <valueName>EAS-ORG SHALL be rejected. Messages with an incorrect value for EAS-ORG as defined above, SHALL be rejected.<br><br>**\*\*See table below for non-IPAWS use.** |
| Special EAS parameter.<br><parameter><valueName>**EASText**</valueName><br><value> Originator authored alert text</value> | O,E/NU | O | *Recommended by ECIG:* If this parameter is present the value is used verbatim to construct alert text or other visual display. [5] *does not define this extension, but does include something similar for CMAS (Mobile phone alerts).* |
| Special EAS parameter.<br><parameter><valueName>**EAS-Must-Carry**</valueName><br><value> TRUE </value> | O,E/O,E | O | If this parameter is present and the value is TRUE, then the CAP message has come from a state governor's office and the EAS system must place the message on air according to the rules defined in the applicable State plan. |
| <resource><br><br>CAP allows multiple Resource Blocks. | O/O | O | Multiple resource block instances allowed. See below for Resource Block elements. |
| <area><br><br>CAP allows multiple Area Blocks. The EAS-CAP Implementation Guide instructs to only use the information in the first area block. See below for Area Block elements. | O/R | R | One area block only.<br><br>Second or more area blocks will not be processed. The presence of more than one area block SHALL NOT cause the message to be rejected or ignored.<br><br> Basic syntax example (also see below):<br><br>  <area><br>    <areaDesc>Arlington, VA</areaDesc><br>    <geocode><br>      <valueName>SAME</valueName><br>      <value>022292</value><br>    </geocode><br>  </area><br><br>See below for Area Block elements. |
| **Resource Block elements**<br><br>Refers to additional file with supplemental info | | | Only needed if audio file or stream is sent. |
| <resourceDesc><br><br>Human-readable description of | C /C | C | Required if there is a **Resource Block**, e.g. mp3, wav or streaming asset. Valid value for CAP IPAWS is : |

**Version 1.0**

| CAP Standard Element Name and definition | CAP 1.2 / OASIS-IPAWS 1.0 Constraint | EAS-CAP I.G. Constraint for IPAWS | CAP to EAS Mapping and Validation Notes |
|---|---|---|---|
| resource, e.g. "map", or "photo". | | | "EAS Broadcast Content" |
| <mimeType> Identifies MIME content type describing resource. | R/R | R | Valid values for OASIS CAP IPAWS are : "audio/x-ipaws-audio", "audio/x-ipaws-streaming-audio", "video/x-ipaws-video" and "video/x-ipaws-streaming-video" . *ECIG allows testing for the file format after download of a file deemed audio/x-ipaws-audio in order to determine if the file is WAV or MP3. ECIG recommends extension to "audio/x-ipaws-audio-wav", audio/x-ipaws-audio-mp3", etc.* |
| <size> Approximate size of resource file in bytes. | O/O | O | |
| <uri> Hyperlink to the resource file; URL on the Internet, or reference to <derefUri> location within the message. | O/O | C | Needed if alert data is referenced. Required if <info><resource> is present. |
| <derefUri> The actual resource file data, if sent within the message. Data is sent as Base64 ascii. | C/C | C | Needed if alert data is sent within message. *ECIG does not recommend using this feature to send multimedia resource data within CAP, due to the enormous expansion of the CAP file length. This method has use in a system where only the CAP message can be sent and received.* |
| <digest> Digital digest "hash" code | O/O | O | |
| **Area Block elements**<br><br>CAP permits more than one. | | | Only the information in the first area block will be used. |
| <areaDesc><br><br>Text describing the affected area.<br><br>Example: <areaDesc>Fifth  Street overpass</areaDesc> | R/ND | NU | ECIG does NOT recommend using  this field in construction of alert text or other visual display. Originators SHOULD include pertinent area  information in the <description> or <instruction> fields. EAS encoded areas are taken from SAME FIPS <area><geocode> list.<br><br>Reference [5] does not place any constraint on use of <areaDesc> values, but the presence of this element is REQUIRED by [4]. |

**Version 1.0**

| CAP Standard Element Name and definition | CAP 1.2 / OASIS-IPAWS 1.0 Constraint | EAS-CAP I.G. Constraint for IPAWS | CAP to EAS Mapping and Validation Notes |
|---|---|---|---|
| <geocode> Any geographically-based code to describe target area.<br><br>valueName = user-defined domain of code.<br><br>value = string denoting the value itself. | O/R | R | **\*** At least one <geocode> with <valueName> of SAME (IPAWS conformance requires "SAME". \*\*See table below for non-IPAWS use.) and one <value> string representing the 6-digit EAS Location code must be defined. The location code must be constructed as defined in CFR 47 Part 11, that is a 5-digit **FIPS** code and a leading digit indicating no subdivision or the 1/9$^{th}$ area sub-division (6 total digits). Each one maps to one EAS Location Code defined as **PSSCCC.** Up to 31 geocodes SHALL be placed into the EAS ZCZC string in the order that they are encountered in the CAP message. This is required to allow duplicate EAS messages to be detected.<br><br>Example of <geocode><br><br>    <geocode><br>      <valueName>SAME</valueName><br>      <value>006013</value><br>    </geocode><br><br>A message with no geocodes, or a message with geocodes but an invalid valueName SHALL be ignored. A message with a valid valueName where the value is not in PSSCCC format SHALL be rejected.<br><br>[5] has also defined the <geocode> <value> of 000000 as referring to all of the United States and US Territories. As of this writing the FCC has not adopted this code for Part 11. |

**Version 1.0**

## Non-IPAWS compliant element handling in the CAP to EAS Validation Table

CAP fields in this table are required by IPAWS but may have different constraints outside of an IPAWS system.

| CAP Standard Element Name and definition | CAP 1.2 / OASIS-IPAWS 1.0 Constraint | EAS-CAP I.G. Constraint for non-IPAWS | CAP to EAS Mapping and Validation Notes |
|---|---|---|---|
| \<alert\>\<code\><br><br>Handling code string. | O/R | C | ECIG notes that vendors may choose to offer EAS triggering of non-IPAWS messages from CAP sources, depending on Local and State emergency plans. In this case, \<code\> may be ignored or have a different requirement. |
| \<alert\>\<info\>\<expires\> Expiration time of the information of the alert. | O/R | O | *Used to derive **EAS Valid Time Period (TTTT) by subtracting from \<sent\>.**<br><br>For non-IPAWS compliant systems, ECIG recommends that if this field is not present, the EAS-CAP Decoder SHALL assume that the expired time is one hour greater than the value in the \<sent\> element, and the value of the EAS Valid Time Period SHALL be 0100, and if there are no other errors, the message SHALL be accepted. |
| Special EAS parameter.<br>\<alert\>\<info\><br>\<parameter\><br>\<valueName\> **EAS-ORG**<br>\</valueName\><br>\<value\> EAS, CIV, WXR, or PEP<br>\</value\> | O,E/O,C, E | O | *Maps to 3 letter **EAS ORG** code.<br><br>For non-IPAWS compliant systems, ECIG recommends messages missing \<parameter\> \<valueName\>EAS-ORG SHALL assume that the originator is CIV, and if there are not other errors, the message SHALL be accepted. |
| \<alert\>\<info\>\<area\>\<geocode\><br><br>valueName = user-defined domain of code.<br><br>value = string denoting the value itself. | O/R | R | * Each one maps to one EAS Location Code defined as **PSSCCC.** Non-IPAWS conforming systems may also use the value "FIPS6" for \<valueName\>. |

# 7  Acronyms

| | |
|---|---|
| ASCII | American Standard Code for Information Interchange |
| ATIS | Alliance for Telecommunications Industry Solutions |
| CA | Class A television |
| CAP | Common Alerting Protocol |
| CAPCP | Common Alerting Protocol Canadian Profile |
| CDC | Centers for Disease Control |
| CFR | Code of Federal Regulations |
| CIV | Civil authorities |
| CMAS | Commercial Mobile Alerting System |
| DAB | Digital Audio Broadcast |
| DBS | Direct Broadcast Satellite |
| DE | Distribution Element |
| DHS | Department of Homeland Security |
| DOM | Document Object Model |
| EAS | Emergency Alert System |
| ECIG | EAS-CAP Industry Group |
| EDXL | Emergency Data Exchange Language |
| EDXL-CAP | Emergency Data Exchange Language Common Alerting Protocol |
| EDXL-DE | Emergency Data Exchange Language Distribution Element |
| EEE | EAS Event code Element |
| EOC | Emergency Operations Center |
| FCC | Federal Communications Commission |
| FEMA | Federal Emergency Management Agency |
| FIPS | Federal Information Processing Standards |
| HazCollect | HazCollect Non-weather Emergency Messages |
| IPAWS | Integrated Public Alert and Warning System |
| ISO | International Organization for Standardization |
| ITFS | Instructional Television Fixed Service |
| LPFM | Low Power FM |
| LPTV | Low Power TV |
| MDS | Multipoint Distribution Service |
| MMDS | Multichannel Multipoint Distribution Service |
| mp3 | MPEG 2, Layer 3 |
| NOAA | National Oceanic and Atmospheric Administration |
| OASIS | Organization for the Advancement of Structured Information Standards |
| OIC | Office for Interoperability and Compatibility |
| ORG | EAS Originator Code |
| PEP | Primary Entry Point |

| PMO | Program Management Office |
|-------|-------------------------------------------|
| RFC | Request for Comments |
| SDARS | Satellite Digital Audio Radio System |
| TIA | Telecommunications Industry Association |
| TTS | Text-to-Speech |
| URL | Uniform Resource Locator |
| WPM | Words Per Minute |
| WXR | National Weather Service EAS Originator Code |
| XML | Extensible Markup Language |