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June, 2012

WORKING GROUP 9

CAP Implementation

Final Report – Part 2

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## 1 Results in Brief

### 1.1 Executive Summary<sup>1</sup>

The Emergency Alert System is the primary warning system that provides the President with the means to address the nation during a national crisis. Over the years it has gone through several transformations but until recently can best be described as an analog delivery system.

On May 31, 2007, the FCC adopted a Second Report & Order to strengthen the development of next generation technology for the Emergency Alert System (EAS).<sup>2</sup> This R&O requires EAS participants to accept messages using *OASIS Standard, Common Alerting Protocol Version 1.2* digital delivery (any further reference to CAP implies this version of the standard). Subsequently, on November 18, 2010 the FCC adopted the Fourth Report & Order to establish the deadline for EAS participants to start receiving CAP messages no later than June 30, 2012.<sup>3</sup> On January 10, 2012 the FCC released the Fifth Report and Order which further clarified the process to receive and transmit CAP messages for the EAS and to streamline the Part 11 rules.<sup>4</sup>

CSRIC Working Group 9 was established to provide recommendations and best practice for the deployment of CAP and to provide an overall progress report on the first months of CAP implementation.

WG9's findings include two important issues:

1. OASIS Standard, Common Alerting Protocol Version 1.2 provides an optional means of securing resource elements (audio, graphics, documents or other multimedia), but its use is not currently required by the IPAWS profile.
2. After ECIG issued its version 1.0 Implementation Guide, FEMA instructed ECIG in a

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<sup>1</sup> What is an Executive Summary?; Source:

[http://www.2myprofessor.com/Common/executive\\_summary.htm](http://www.2myprofessor.com/Common/executive_summary.htm)

<sup>2</sup> FCC Second Report and Order, in the Matter of the Review of the Emergency Alert System, EB Docket No. 04-296, Adopted: May 31, 2007

<sup>3</sup> FCC Fourth Report and Order, in the Matter of the Review of the Emergency Alert System, EB Docket No. 04-296, Adopted: September 15, 2011

<sup>4</sup> FCC Fifth Report and Order, in the Matter of the Review of the Emergency Alert System, EB Docket No. 04-296, Adopted: January 9, 2012

memorandum to limit audio to MP3 only. ECIG concurred with this and noted it on their web site, but has not yet issued an update to their 1.0 Implementation Guide.

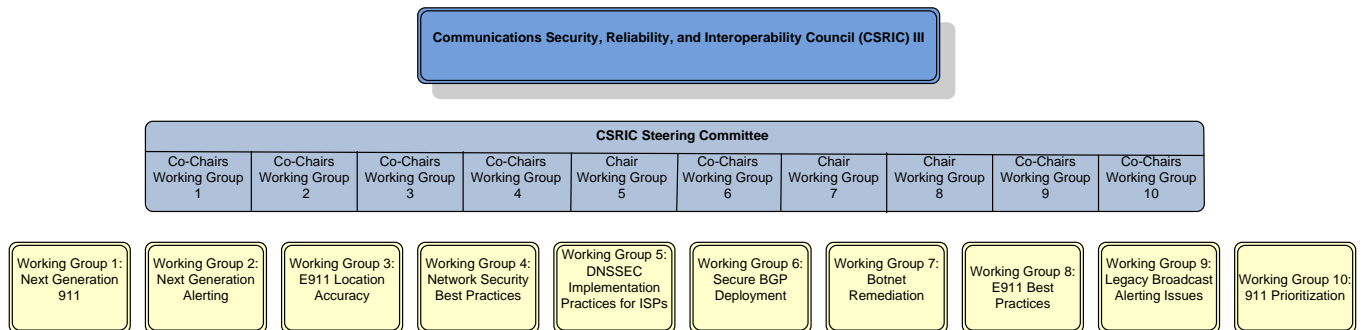
## 2 Introduction<sup>5</sup>

CSRIC was established as a federal advisory committee designed to provide recommendations to the Commission regarding best practices and actions the Commission may take to ensure optimal operability, security, reliability, and resiliency of communications systems, including telecommunications, media, and public safety communications systems.

Due to the large scope of the CSRIC mandate, the committee then divided into a set of Working Groups, each of which was designed to address individual issue areas. In total, 10 different Working Groups were created, including Working Group 9 on EAS CAP Implementation.

Working Group 9 officially started its work in December 2011 and was given until March 2012 to produce their First Report. The focus for Working Group 9 is to review the Fifth R&O (released January 10, 2012) on CAP deployment, provide FCC recommendations for best practices to facilitate CAP implementation on a national level, state and local level and identify technological challenges. The second report due in June 2012 will review the progress of CAP implementation by EAS Participants for both national and state level.

### 2.1 CSRIC Structure




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<sup>5</sup> Writing@CSU; Source: <http://writing.colostate.edu/guides/processes/science/pop2a3.cfm>

## 2.2 Working Group 9 Team Members

Working Group 9 consists of the members listed below.

Name	Company
Al Kenyon	Federal Emergency Management Agency (FEMA)
Andy Scott	NCTA
Bill Marriott	Comlabs
Bill Robertson	Digital Alert Systems (Monroe Electronics, Inc.)
Bob Sherry	Intrado
Chris Homer (Chair)	DIRECTV
Clay Freinwald	Washington SECC
Daryl Parker	TFT
Donald Walker	GRM
Edward Czarnecki (Co-Chair)	Monroe Electronics, Inc.
Gary Timm	Wisconsin SECC
Harold Price	SAGE Alerting Systems
Jeb Benedict	CenturyLink
Jeff Staigh	Univision
Jim Gorman	Gorman-Redlich
Kelly Williams	National Association of Broadcasters
Larry Estlack	Michigan Association of Broadcasters
Matthew Straeb	GSS
Michael Hooker	T Mobile
Mike Nawrocki	Verizon
Ron Boyer	Boyer Broadband
Tim Dunn	T-Mobile
Eric Ehrenreich	FCC Liaison
Doug Semon	Time Warner Cable

Table 1 - List of Working Group Members

## **3 Objective, Scope, and Methodology**

### **3.1 Objective**

In its January 2012 EAS Fifth Report and Order (EB Docket No. 04-296), the Commission sought to continue the process to transform the Emergency Alert System (EAS) into a more technologically advanced alerting system by revising Part 11 Emergency Alert System (rules) to specify the manner in which EAS Participants must be able to receive alert messages formatted in the Common Alerting Protocol (CAP) and streamlining Part 11 rules to enhance their effectiveness and provide clarity.

The Fifth Report & Order is the second of two orders that implement Part 11 rule changes stemming from the Third Further Notice of Proposed Rule Making (FNPRM). The previous order, Fourth Report & Order, addresses the single issue of establishing a new deadline of June 30, 2012 for meeting the various CAP-related requirements that the Fifth R&O codifies. The Working Group was asked to review the new order to provide insight, implementation recommendations and status. In this Fifth R&O Report, the Working Group shall also recommend actions the FCC could take to improve EAS as it incorporates the new CAP protocol.

### **3.2 Scope<sup>6</sup>**

Per the Working Group 9 charter, the group found it essential to begin with an initial focus on the FCC Part 11 Rules governing the EAS as it involves best practices to facilitate CAP implementation leading up to and beyond the June 30, 2012 deadline. The committee will be working with real-time data and events as they unfold during the roll out. Based on results of these events the group will gain valuable insight and metrics that will be used for future planning and rulemaking.

### **3.3 Methodology<sup>7</sup>**

The Working Group 9 uses a collaborative, inclusive approach to its work. Given the vast array of expertise the WG-9 members brought to bear on this effort, it is critical to provide a multitude of forums and mediums through which participants could express their opinions and help shape

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<sup>6</sup> Elements of a Research Proposal and Report; Source: <http://www.statpac.com/research-papers/research-proposal.htm>

<sup>7</sup> Elements of a Research Proposal and Report; Source: <http://www.statpac.com/research-papers/research-proposal.htm>

this Final Report. The following section details the methodology through which WG-9 achieved this objective.

### 3.3.1 Sub-Group Structure

After its initial set of meetings, the Chair and Co-Chair of Working Group 9 decided to review the structure of the Working Group and develop a plan that would allow for WG-9 to proceed with its study in an organized fashion which leveraged the diverse backgrounds of the Group's membership.

As such, WG-9 broke into two Sub-Groups; WG-9-1 is focusing on National implementation and best practices of CAP, WG 9-2 focusing on the progress of CAP implementation and best practices at the state & local level. The two Sub-Groups have moved forward with independent conference calls that focused almost exclusively on the portions of the CAP implementation most applicable to their expertise.

Each Sub-Group has a Lead who develops an agenda and framed conversation and discussion amongst the participants. On some of the more divisive issues the Lead worked to bring members closer to consensus and encouraged open dialogue designed to find common ground.

### 3.3.2 Collaboration via Portal

In addition to the regular conference calls, an online collaboration portal was designed and implemented for use by the WG-9 participants. The portal is accessible to all Working Group members throughout the duration of their work on behalf the CSRIC. The table below details some of the most prominent capabilities featured on the Portal and how they were used by the members of the Working Group 9.

Document Repository	Collaboration space where members posted, reviewed, and edited documents
Forum	Open space where issues were discussed amongst members
Calendar	Central location where all relevant meetings and events were documented

From its inception, the portal became a useful tool for the Working Group as they shared ideas, resources, and collaborated on common documents, including this Final Report. Given the disparate locations from which the WG-9 members originated, having an online collaboration tool was instrumental to the successful completion of the Working Group's final product.

## 4 Background

From the onset of WG-9's work, close attention was paid to the researching relevant topics, including the EAS, the Integrated Public Alerts and Warning System (IPAWS), the CAP, and the Commercial Mobile Alert System (CMAS) and other alerting methodologies. Several members of the 9 Working Group brought specialized expertise in one or more of these areas and are also members of WG-2 that is focused on future developments in EAS systems.

### 4.1 Emergency Alert System (EAS)

EAS is the primary national warning system that provides the President with the means to address the nation during a national crisis. State and local officials also use EAS to originate warning messages about imminent or ongoing hazards in specific regions. Three Federal agencies share responsibility for EAS at the national level: the FCC, FEMA, National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS).

Functionally, EAS is a hierarchical alert message distribution system. Initiating an EAS message, whether at the national, state, or local level, requires the message originator (e.g. FEMA, which initiates EAS alerts at the national level on behalf of the President) to deliver specially-encoded messages to a broadcast station-based transmission network that, in turn, delivers the messages to individual broadcasters, cable operators, and other EAS Participants. EAS Participants maintain special encoding and decoding equipment that can receive the message for retransmission to other EAS Participants and to end users (broadcast listeners and cable and other service subscribers).

On May 31, 2007 the FCC adopted a Second Report and Order and Further Notice of Proposed Rulemaking (EB Docket 04-296, FCC-07-109A1) (Erratum, DA-07-4002A1) to strengthen the EAS and to promote the development of fully digital next generation technologies and delivery systems for EAS. The Second Report and Order requires EAS participants to accept messages formatted using CAP, the groundwork for next generation EAS delivery systems, no later than 180 days after FEMA announces its adoption of standards in each case. CAP is intended to ensure the efficient and rapid transmission of EAS alerts to the public in a variety of formats (e.g. text, audio and video) and via different channels (e.g. broadcast, cable, satellite, and other networks).

On May 25, 2011, the FCC adopted the Third FNPRM, in which they sought comment on a wide range of tentative conclusions and proposed revisions to the Part 11 rules that would more fully delineate and integrate into the Part 11 rules the CAP-related mandates adopted in the Second Report and Order. The Commission received 30 comments and 12 reply comments in response to the Third FNPRM.



Subsequently, on November 18, 2010, the FCC adopted the Fourth Report and Order in this docket, in which they amended section §11.56 of the EAS rules to require EAS Participants to be able to receive CAP formatted EAS alerts no later than June 30, 2012.

Finally, in the January 2012 FCC Fifth Report and Order on EAS (EB Docket No. 04-296), the Commission sought to continue the process to transform the Emergency Alert System (EAS) into a more technologically advanced alerting system by revising Part 11 Emergency Alert System (rules) to specify the manner in which EAS Participants must be able to receive alert messages formatted in the Common Alerting Protocol (CAP) and to streamline Part 11 rules to enhance their effectiveness and to provide clarity.

## 5 Analysis, Findings and Recommendations

### 5.1 Analysis<sup>8</sup>

CSRIC WG9 is examining a broad range of questions relating to the usage of CAP for next-generation EAS;

#### CAP Distribution

1. What CAP-EAS Distribution Network architectures exist at the federal, state and local level?
2. What are the physical and data components of these systems?
3. What are the interface requirements?

#### EAS Network Requirements

1. What is sufficient capacity to relay messages?
2. What availability is required to maintain service?
3. How does authentication work?
4. How is data security maintained? Data accuracy?

A specific initial area of investigation by WG9 pertains to the impact of the FCC's Fifth Report and Order on EAS (released 10 January 2012) on CAP EAS migration. WG9's initial discussions, and by extension of focus of this particular report, are on two fundamental issues emerging from the Report and Order:

1. Prohibition on the use of text to speech technology on CAP EAS devices by EAS Participants
2. Creation of a "streamlined" certification regime for CAP EAS equipment, which includes three distinct classes of CAP EAS equipment, with slightly varying certification requirements, based on the nature of that equipment.

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<sup>8</sup> Elements of a Research Proposal and Report; Source: <http://www.statpac.com/research-papers/research-proposal.htm>

## 5.2 Findings

### 5.2.1 Authentication Audio Resources in CAP EAS Messaging

The Working Group took note of the fact that while there is optional protection for data referenced by CAP resources, for example, audio in a "uri", this protection is not mandatory. This raises the potential of the resource being modified outside the protection of the digital signature on the CAP message itself.

### 5.2.2 Audio file types (codecs) for CAP EAS messaging

The Working Group observed an apparent discrepancy between the standards/specifications incorporated by the FCC's revised rules on EAS, and additional guidance provided by FEMA IPAWS to the EAS-CAP Industry Group.<sup>9</sup> Specifically, after ECIG issued its 1.0 version of the implementation guide, FEMA instructed ECIG in a memorandum that

“IPAWS agrees that the audio encoding should be constrained to allow **MP3 ONLY** audio formats encoded as described in § 3.5.2 (1): “mono, 64 kbit/s data, preferably sampled at 22.05 kHz or otherwise at 44.1 kHz.” IPAWS agrees that the <contentType> element should be appended with the file type name (as in “audio/x-ipaws-audio-mp3”) to eliminate the need for file type determination by inspection. These constraints will only apply to messages transmitted through IPAWS and intended for EAS distribution. EAS devices retrieving messages from other sources are not so constrained. This memo (to be published on the ECIG website) in addition to the Implementation Guide should suffice as guidance documentation, and no revision to the CAP standard or Profile are required.” [emphasis in the original].

However, the ECIG Implementation Guide v1.0 – as incorporated by the FCC – allows for both the mp3 and wav audio file formats. The original IPAWS profile v1.0 does not restrict audio file formats.

The Working Group observed that all known manufacturers of CAP EAS receiving equipment (integrated encoder/decoders and intermediary devices) currently support the mp3 file format, so there should be little to no impact on manufacturers and EAS participants. The Working Group observed that there may be an impact on alert origination systems/technologies, if they do not currently support the ability to generate an MP3 file formatted audio resource.

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<sup>9</sup> “MEMORANDUM to the EAS-CAP Industry Group (ECIG) from the Integrated Public Alert and Warning System (IPAWS) Program Management Office regarding the ECIG IG Concurrence Memorandum of August 9, 2010 (dated December 2, 2010) [http://eas-cap.org/ECIG\\_IG\\_Concurrence\\_Memorandum%20v21.pdf](http://eas-cap.org/ECIG_IG_Concurrence_Memorandum%20v21.pdf)

## **5.3 Recommendations & Best Practices**

### **5.3.1 Recommendation Authentication Audio Resources in CAP EAS Messaging**

The Working Group's recommendation is that any CAP messages intended for dissemination via the IPAWS aggregator should include a digest element, as referenced in the CAP 1.2 standard. The digest element is "optional" in the CAP 1.2 standard. According to the OASIS standard, the code representing the digital digest ("hash") computed from the resource file (OPTIONAL) is calculated using the Secure Hash Algorithm (SHA-1) per [FIPS 180-2].<sup>10</sup> The Working Group suggests that this approach would provide for authentication of resource elements. The Working Group concurred that the message origination systems/technologies would need to handle the action of attaching the message digest, not the CAP EAS receiving equipment.

The Working Group recommended that use of the "digest element" should be required when a resource element is referenced in a CAP message, when intended for CAP EAS.

To this end, the working group further recommended that ECIG should consider revising its Implementation Guide to include a requirement to use the digest element for authentication of resource elements.

The Working Group further recommends that state and local alert system originators that do not transit CAP messaging through the IPAWS aggregator should likewise implement improved mechanisms for authentication of resource elements, including usage of the CAP digest element.

### **5.3.2 Recommendation Audio file types for CAP EAS messaging**

In light of the FEMA concurrence memo to ECIG of 10 December 2010, specifying mp3 usage only, the Working Group agreed on a recommendation for ECIG to update their implementation guide to specify file/MIME types to MP3 audio only.

We further agreed on a recommendation that, if amending the standards incorporated by reference represents a substantive change to a rule section in 47 CFR Part 11, then the FCC should only act if a change to a rule section would be substantive, undertake its public comment process to amend this reference in Part 11 (e.g., from ECIG 1.0 to a updated version of the Implementation Guide, and/or adding reference to the FEMA concurrence memorandum). The Working Group acknowledged its understanding that this would require a notice and comment rulemaking proceeding prior to implementing the change.

Short of an additional rule change, the FCC should clarify whether the FEMA concurrence

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<sup>10</sup> OASIS Common Alerting Protocol Version 1.2, 01 July 2010

memorandum suffices as guidance documentation, without further specification the revised EAS rules.

### **5.3.3 Best Practice**

The Working Group observed that – on this issue - the CAP standard or existing IPAWS profile 1.0 may not provide sufficiently specific guidance for CAP message originators (developers). We observe that FEMA may be well served by evaluating two options:

1. The FEMA aggregator could actively have to inspect for “illegal” file types, and/or
2. Developers should be strongly encouraged (if not required) to subject their systems to the existing FEMA conformity assessment for originators, to ensure proper conformance to the audio file specification. It was our understanding that the original IPAWS conformity process (completed by some 5 systems) had their support of mp3 origination evaluated. This recommendation would dovetail the draft section on conformity under consideration by WG9-2.
3. We observed that the second option (conformity assessment) could be the least-resource intensive method for FEMA to achieve several common objectives, since their conformity standards are already developed, and the resource requirements (including costs) would be borne by the developer by using NIMS P-TAC as the evaluator.

## 6 References

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- EAS CAP Industry Group, EAS-CAP Implementation Guide Subcommittee, CAP EAS Implementation Guide, Version 1.0, 17 May 2010, <http://www.eas-cap.org/>.
- Federal Communications Commission (FCC) Code of Federal Regulations (CFR), Title 47, Part 11, <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=47:1.0.1.1.11&idno=47>.
- MEMORANDUM to the EAS-CAP Industry Group (ECIG) from the Integrated Public Alert and Warning System (IPAWS) Program Management Office regarding the ECIG IG Concurrence Memorandum of August 9, 2010 (dated December 2, 2010) [http://eas-cap.org/ECIG\\_IG\\_Concurrence\\_Memorandum%20v21.pdf](http://eas-cap.org/ECIG_IG_Concurrence_Memorandum%20v21.pdf)
- FEMA IPAWS, <http://www.fema.gov/emergency/ipaws/>.
- OASIS Common Alerting Protocol Version 1.2, OASIS Standard, 01 July 2010, <http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.pdf>.
- OASIS Common Alerting Protocol (CAP) v1.2 USA Integrated Public Alert and Warning System Profile Version 1.0 – Committee Specification 01, 13 October 2009, <http://docs.oasis-open.org/emergency/cap/v1.2/ipaws-profile/v1.0/cs01/>.
- Specific Area Message Encoding (SAME), <http://www.weather.gov/nwr/nwrsame.htm>.