Public Warning Design Guidelines for FIA Messaging

Summary:

This document provides voluntary guidelines for Federation for Internet Alerts (FIA) Partners when communicating emergency warnings to the public as publishers of messages from official alerting authorities. Such FIA messaging is employed only when people need to act immediately or within the next hour in response to an extraordinary or significant threat that is already observed or likely to occur.

Online media such as FIA Partners are using the Common Alerting Protocol (CAP) standard in their efforts to help alerting authorities disseminate warnings. Although CAP is an essential enabling standard, it does not address how to present messages to end user devices. If messaging system developers each make their separate presentation design choices, users could be confused by inconsistent warning presentations. Use of these Guidelines should help such developers to harmonize their design choices.

These Guidelines focus on internationally harmonized design elements that help to: distinguish among hazard types, convey the importance of a warning, and prompt appropriate response actions. Presentation design topics include: Graphics, Text, Interaction, Audio, Video, Persons with Disabilities, Understandability, Constancy, Telecommunications Efficiency, and Markup Language.

These Guidelines also provide technical details concerned with the processing of warnings for FIA Messaging. The technical topics include criteria to select warnings from official alerting authorities and identify the type of event. These Guidelines also address the handling of updates, geo-targeting, the duration and cancellation of warnings, and the use of test and exercise alerts.

Several policy-oriented topics are also discussed in these Guidelines, primarily in the context of the existing self-regulatory Code of Conduct applicable to FIA Partners. That includes the prohibition on collection of personally identifiable information. These Guidelines note that public warnings are not subject to opt-out and AdChoices and that precise geo-location requires user opt-in. It is further noted that FIA Partners should be responsive to requests from alerting authorities for appropriate access to general/aggregated analytic data associated with public warnings. These Guidelines also advocate that text and design works used in presenting public warnings should be non-proprietary.

Status:

These Guidelines intend to represent a broad consensus among online media companies as well as key international bodies that have a defined role in technical aspects of alerting or particular hazard threats. This is a technical document produced collaboratively, primarily among individuals listed in the Acknowledgments section. It has been developed under the auspices of FIA.

Public Warning Design Guidelines for FIA Messaging

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1.   Need, Prior Work, and Consensus Process

1.1.   Need for FIA Messaging Guidelines

Telecommunications is a crucial part of the emergency warning infrastructure. For instance, through a public-private collaboration requiring huge investments in specialized technology, television stations insert certain official warnings as a "text crawl" in broadcast television. Yet, more and more people are using online media and would not get a warning on broadcast television. Mechanisms to present such warnings to people online have become practical because of the adoption of the Common Alerting Protocol (CAP) standard [1] (International Telecommunication Union Recommendation X.1303).

CAP-based online media warning to the public was pioneered on a large scale in the Google.Org Public Alerts initiative [2] and by Conversant (tornado warning shown right) in its role as a Partner in the Federation for Internet Alerts (FIA). [3] FIA is a facilitator for Internet technology and services collaboration among companies, non-governmental organizations, and alerting authorities to promote standards-based, all-hazards, all-media, authoritative alerting for societies worldwide. FIA messaging refers to online communications by FIA Partners, which may involve use of "ad servers" and other technologies normally used to disseminate advertising for publishers but here used to convey public warnings in the event of an imminent threat.

Online media such as FIA Partners are increasingly leveraging CAP-enabled resources and capabilities to help alerting authorities disseminate warnings to people online in threatened areas. Sending CAP-enabled warnings via online media has certain advantages. When a CAP message includes geographic information, alerts can be more precise in geo-targeting just those who need to be alerted. Online warning may also allow people to selectively see warnings based on what they need/want and what they are doing, which should be better than providing warnings based solely on where they are. In addition, CAP-enabled alerting can efficiently address a wide range of devices: desktop and laptop PCs, tablets, smart phones, cell phones, highway signs, and in-car navigation devices, among many others.

CAP is essential in that it standardizes the format of alert messages, but CAP does not address how alert messages should be presented to a person receiving the message. Messaging system developers each make their separate choices on presentation design aspects, such as specific warning text, fonts, icons, and colors. In addition, the varying characteristics of display devices must be taken into account, as in the range of presentation designs developed by Conversant and the U.S. National Weather Service for different sizes and orientation across different devices (examples shown right).

The need for FIA messaging guidelines in the presentation of public warnings arises
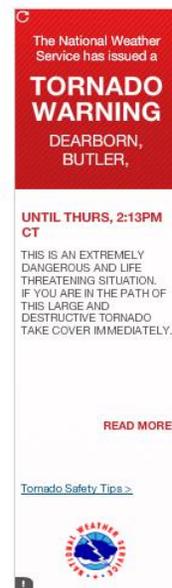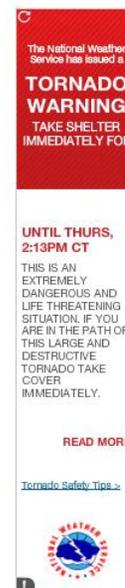
because different online media will be presenting warnings across overlapping audiences. That means people online could receive inconsistent presentations of warnings for the same event. Inconsistent presentation of warnings can be confusing, and confusion is dangerous in life-threatening situations.

1.2. Prior Design Guidelines for Emergency Alerting

Various consensus-building initiatives have addressed to some degree the need for harmonized presentations of alert information. The World Meteorological Organization (WMO) provides consensus expert guidance concerning warnings, such as the "Guide on Improving Public Understanding of and Response to Warnings" [4] and the "Guidelines on International and Cross-Border Collaboration in the

Warning Process" [5]. A procedure for evaluating image effectiveness in the context of safety symbols is included within the standard "Criteria for Safety Symbols" (ANSI Z535.3-2011), which provides general criteria for the design, evaluation, and use of safety symbols. [6] Canada has published its "Common Look and Feel Guidance" for its National Public Alerting System. [7] Also, the MeteoAlarm initiative [8] standardized certain aspects of weather-related alerts across 30 European nations and 35 languages. The U.S. Wireless Emergency Alert (WEA) system has also defined some details in certain kinds of alerts. An example WEA message disseminated during Hurricane Sandy in 2012 is shown right.

With regard to standardized symbols for emergencies, a report by Nuwan Waidyanatha [9] notes that the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) has defined 500 symbols for humanitarian response [10]. He also notes that the government of Canada designed emergency mapping symbols [11] and that the U.S. Department of Homeland Security sponsored development of a set of symbols [12]. (Example symbols from each set respectively are shown right for landslide, fire, and tornado hazard threats).

1.3. Consensus Process for These Voluntary Guidelines

It is necessary to assure that the specific text in each language for each kind of warning (tornado, flood, etc), as well as design aspects such as fonts, colors, symbols, and logos, are acceptable to the alerting authorities for the affected areas. FIA messaging is seen as publishing, not authoring nor editing the essential content of messages.

FIA Guidelines for online warnings presentation will be useful to the degree that consensus encompasses not only online media but official alerting authorities and the communities of hazard experts that support them. The communities of hazard experts typically deal with particular types of hazard threats (cyclones, earthquakes, tsunami, volcanoes, chemical spills, etc). For instance, advice on design guidance should be sought from the Intergovernmental Oceanographic Commission (IOC) for tsunami warnings, and the International Civil Aviation Organization (ICAO) for volcanic ash warnings. MeteoAlarm already has consensus on certain symbols, fonts, text, and colors for weather alerts in Europe, and OCHA already has some consensus on its set of symbols for emergencies.

In developing consensus on presentation design for online warnings, liaison should be maintained with the OASIS Emergency Management Technical Committee (EM TC), which handles the CAP standard. CAP has been very successful with standardizing the exchange of alerting information and its experts are likely to have strong interest in and familiarity with how warnings are presented. In addition, the EM TC should review draft warning presentation proposals for any CAP implications.

As an aid to FIA Partners that implement public warning using these Guidelines, and to facilitate review of key components by FIA Supporting Authorities, a FIA Reference Service should be maintained online for the sharing without charge of: these Guidelines, samples of public warnings through FIA messaging, common message design and delivery components, and other pertinent policy and technology materials.

2.   Warning Presentation Design Guidelines

FIA messaging is employed only when people need to act immediately or within the next hour for an extraordinary or significant threat that is already observed or likely to occur. The following warning presentation design guidelines are intended for use by online media in developing communications that help disseminate official alerts of significant hazard threats, and thereby prompt people online in the alerting area to better protect life and property. (To understand how CAP can be injected into online display space it may be useful to view the video titled "The Evolution of Online Display Advertising". [13])

For specifics about selecting warnings from official sources of CAP alerts see section 3, Processing of Warnings for FIA Messaging.

2.1.   Graphics Design

Creatives used for public warnings through FIA messaging should include a pictograph depicting the action to be taken (example tsunami pictograph shown right). Pictographs used in any particular country should be from a common design set, such as one of those sets of symbols noted in 1.2 above.

Creatives used for public warnings through FIA messaging should include the logo of the alerting authority (example shown right) linked to the primary Web resource, if included in the CAP alert, and otherwise to the alerting authority Web site.

For each authority and each type of hazard event in use for public warnings through FIA messaging, an authority logo and at least one scalable pictograph should be available on the FIA Reference Service.

2.2.   Text Design

The main warning text should be presented as solid, pure white (RGB=255,255,255) against a background color of solid, pure red (RGB=255,0,0).

Text fonts should be selected for high readability at all sizes anticipated. Text should be presented statically, rather than with any animation effects or scrolling.

FIA messaging may sometimes have enough space for the presentation of extended text passages (which may be static text or text taken dynamically from CAP alert elements such as "description", "instruction", and "areaDesc"). More commonly, there will be room for only an excerpt of the text passage. To create an excerpt, an ellipsis can be used to indicate where the text has been truncated. However, finding a word break is problematic in some languages. In those cases, consultation with an expert is needed on how to process text passages that may need to be truncated.

It can be useful to define a method for generating a short warning phrase based on the event type (e.g., "Tornado", "Tsunami", "Hurricane") together with a term associated to the value of the CAP "severity" element ("Extreme" or "Severe") and the value of the CAP "certainty" element ("Observed" or "Likely"). In the case of a tsunami, the four short warning phrases might be: "**Warning! Extreme Tsunami Observed**", "**Warning! Extreme Tsunami Likely**", "**Warning! Severe Tsunami Observed**", "**Warning! Severe Tsunami Likely**".

The character length of the text message is a primary consideration for warnings through FIA messaging. If more than 100 text characters would be readable in a message on a particular device, the value of the CAP "headline" element should be shown. However, that much space may not be available because FIA messaging areas, particularly on mobile devices, are typically much smaller than the full presentation area on the device. Size is an especially tight constraint for the smallest devices such as smart phones, smart watches, etc.

To optimize the highly constrained space while remaining readable, static pre-defined ("canned" or "pre-scripted") text messages should be selectable for a range of character lengths. Canned text for public warnings through FIA messaging should be available on the FIA Reference Service. For illustration, the series of progressively shorter text shown in Table 1 might be selectable to produce different sized FIA messages for an "extreme tsunami observed" warning.

TABLE 1. TEXT MESSAGES OF VARIOUS LENGTHS

100	Tsunami danger on the coast. Go to high ground, up to third floor, or inland. Listen to local news.
90	Tsunami danger on the coast. Go to high ground or move inland. Listen to local news - NWS
78	Tsunami danger on the coast. Get higher or move inland. Listen to local news.
56	Tsunami danger on the coast. Get higher or move inland.
41	Tsunami danger. Get away from the coast.
34	Warning! Extreme Tsunami Observed
25	Warning! Extreme Tsunami
16	Tsunami Warning
7	Tsunami

It should be noted that the 90 character limit is a specific requirement of the WEA system.

2.3. Interaction Design

Any public warning through FIA messaging that is presented on an interactive media such as a Web page should be interactive for the click action. (Herein, the click action encompasses a range of user actions including a tap or press gesture and various other ways for users to trigger a click event.)

The default action for a click on the authority logo within the FIA message should be to link to the alerting authority Web site.

The default action for a click anywhere else on the FIA message should be to link to the primary Web resource URL in the "info/web" element if included in the CAP alert and otherwise link to the alerting authority Web site.

2.4. Audio and Video Elements

When specifically agreed by the relevant alerting authorities, the presentation of a public warning through FIA messaging may be accompanied by a distinctive tone which has particular audio characteristics. To minimize possible confusion, such public warnings through FIA messaging should not be accompanied by any such tone in the absence of a specific agreement.

Public warnings through FIA messaging may take the form of a video pre-roll. In that case, the design of the warning displayed as a pre-roll should be similar to FIA messaging as otherwise described in these Guidelines.

2.5.　Persons with Disabilities

In compliance with Section 508 of the U.S. Rehabilitation Act [14], public warnings through FIA messaging should be accessible to persons with disabilities by application of the Web Content Accessibility Guidelines [15] and other countries may have similar requirements. For example, the pictograph in Section 2.1 should have alternative text for screen readers such as: .

It should be noted that whenever there is a choice between displaying text as a graphic versus using actual text, the use of actual text is much preferred. For example, it is better to code an HTML text element with the words "Tornado Warning" than to have those words in an image element.

It should also be noted that in an online advertising context, automatic playing of audio may be restricted by network policy and may also require user opt-in.

2.6.　Understandability and Constancy

The public warning through FIA messaging should be as simple as possible while communicating essential information, with the most important information presented first.

Given the potentially life-critical nature of public warnings, it is important that the public warnings through FIA messaging are readily understandable by people who receive them. The results of surveys can be instructive in this regard, and should be supplemented by realistic and representative user testing.

Unless there is a compelling need for revising the design of a warning through FIA messaging, the design should be constant over long periods of time. It is in the nature of public warnings subject to these Guidelines that only rarely would a particular person receive multiple warnings per year.

2.7.　Telecommunications Efficiency

As the speed of telecommunications continues to increase, the file size of messages has tended to become ever larger. However, the efficient use of telecommunications capacity should remain a major concern in the context of public warning during emergencies. This concern is driven by several considerations: it is sometimes necessary to communicate very rapidly to a very large number of devices in an alerting area; the telecommunications capacity in an alerting area may be limited even in normal use and overstressed in an emergency due to its heavy use by the people affected; and, the usual telecommunications capacity may be degraded due to effects of the emergency itself.

One of the critical factors in efficient telecommunications is the total size of the information that must be delivered. Important considerations specific to file size in a CAP alert setting are documented in a 2012 report by the Centre for Security Sciences of Public Safety Canada. [16]

2.8.　Alerting Messages Evolve

Changes can be expected in how hazard threats are communicated to the public by alerting authorities. For instance, many hazard alerting systems today differentiate hazard threats according to an "Advisory, Watch, and Warning" scale. Because surveys have found that this scale remains confusing to the public, the U.S. National Weather Service is working to simplify alert messaging. This simplification should be complementary to the way CAP uses urgency, severity, and certainty to rank a hazard threat according to "how soon", "how bad" and "how sure". There is also ongoing work to make public alert messaging less focused on characterizing the hazard event and more focused on what impacts the event will likely have on the particular community. This impact-based alerting should also be complementary to adoption of CAP, especially the CAP distinction between the "description" and "instruction" elements.

2.9. Markup Language

In order to speak to users universally and consistently on personal computers, tablets, smart phones and future devices, FIA Partners should publish the creative in HTML 5. Future updates to HTML 5 or future versions of HTML may require updates to the creative after sufficient internal quality assurance.

2.10. Localization

In designing for presentation of text in warnings, the principles of internationalization and localization should be used to optimize the user experience. The design should take into account preference settings, typically selectable at the device level and often selectable at the application level as well.

3. Processing of Warnings for FIA Messaging

3.1. Sources are Official Alerting Authorities

Official alerts are to be pulled from or pushed from a host server operated on behalf of an officially designated alerting authority or one of its designated agents, which authority should be registered in the international Register of Alerting Authorities. [17] Official alerts are here assumed to be in CAP format and an alert is typically referenced as an item in a news feed maintained by the alerting authority.

To minimize delay, alert sources such as news feeds should be augmented so that alerts can be delivered immediately. For instance, the Alert Hub approach pioneered by Google.Org can be used to push an alert notification to subscribers. [18]

3.2. Selection Criteria for Warnings

Only a fraction of all CAP alert messages are regarded as public warnings in the scope of these Guidelines. In the case of the U.S., public warnings through FIA messaging meet the criteria for "Imminent Threat Alert" per the United States Code of Federal Regulations (CFR), 47 CFR 10.400. [19] These public warnings are valid as CAP version 1.1 or 1.2, and have these CAP element values: "Actual" in the "status" element; "Alert" or "Update" in the "msgType" element; "Public" in the "scope" element; "Immediate" or "Expected" in the "info/urgency" element; "Extreme" or "Severe" in the "info/severity" element; and "Observed" or "Likely" in the "info/certainty" element. Also, in line with WEA, public warnings through FIA messaging for the U.S. do not include CAP alerts having the element "info/parameter" where the subelement "valuename " equals "BLOCKCHANNEL" and the subelement "value" equals "CMAS". The U.S. criteria for selecting warnings using values of CAP elements are summarized in Table 2 below.

TABLE 2. WARNING CRITERIA USING VALUES OF SPECIFIC ELEMENTS IN CAP ALERTS

status	msgType	scope	info/ urgency	info/ severity	info/ certainty	info/parameter/
Actual	Alert Update	Public	Immediate Expected	Extreme Severe	Observed Likely	valueName="BLOCKCHANNEL" value="CMAS"

Note that other alerting authorities will have different criteria. For example, Canada CAP alerts have a "yes/no" parameter that determines whether an alert is to be handled as "broadcast immediately".

[20] China also may use a special flag in their CAP alerts to identify the "red alerts" that merit FIA messaging.

3.3.   Alerts with Multiple "info" Elements

A CAP alert may specify multiple "info" elements ("blocks"), each one having sub-elements that affect the warning selection criteria, as well as a different language, different alerting areas, etc. For purposes of these Guidelines, each of the multiple info elements should be treated as a discrete CAP alert.

3.4.   Identifying the Type of Event

It is necessary to identify the type of event (e.g., tornado, tsunami, and hurricane) as part of the process of selecting which alerts should trigger a public warning through FIA messaging. For example, the rule to identify a tsunami alert may be that "tsunami" occurs as the first seven characters (case insensitive) in the "event" element of a CAP alert (this example is for U.S. operated tsunami warning centers). The specific rules agreed in public warning through FIA messaging in order to identify the type of event should be available on the FIA Reference Service. [21]

3.5.   Handling Updates

A CAP message with msgType "update" updates and supersedes (replaces in full) all earlier message(s) identified in the value of the "references" element. All updates to warnings previously disseminated should be evaluated, even if the update does not meet the criteria for "Imminent Threat Alert" (described above). This is necessary because an update may change one or more of the CAP values of urgency, severity, or certainty or otherwise affect the duration of the warning (described in 3.7 below).

3.6.   Geo-targeting of Warnings

Warnings should be disseminated according to the geographic information available in the CAP alert, specified in the "info/area" element(s). It should be noted that diverse alerting areas can be specified in a single alert, i.e., an alert may specify multiple "info" elements ("blocks"), each having separate alerting areas with diverse values of the warning selection criteria.

3.7.   Duration of Warning

Warnings should be disseminated according to the starting date/time in the CAP alert or update and the expiration time if the value of the "info/expires" element is in the CAP alert. The starting date/time is the value of, in preferred order: the "info/effective" element (if included), the "info/onset" element (if included), or the value of the "sent" element (always included). The starting date/time (with time zone localized to the targeted device) should be displayed in the warning. The date/time of expiration, if in the CAP alert, should also be displayed in the warning (with time zone localized to the targeted device). No warning should be disseminated for alerts having an expiration time that is past.

3.8.   Cancellation of Warning

Once FIA Partners have disseminated a warning message, they should monitor for CAP alerts that cancel it. The cancellation CAP message will have "Actual" in the "status" element; "Cancel" in the "msgType" element; "Public" in the "scope" element; and, the warning will be identified among the earlier messages in the value of the "references" element. On receipt of the cancellation, dissemination of that warning to its alerting areas should cease.

3.9. Use of Test and Exercise Alerts

Those involved in helping to disseminate public warnings should simulate for test and exercise purposes the dissemination of messages meeting the criteria for warnings summarized in Table 2, except that the "status" element has the value "Test" or "Exercise". In an exercise simulation, the exercise identifier might be found in the value of the "note" element of CAP alerts.

3.10. CAP Best Practices Guidelines

A guidance document entitled "Example Practices: CAP Feeds" is available as an OASIS Committee Note [22] and there is a companion document with example practices for various CAP elements, entitled "Example Practices: CAP Elements". [23] Of particular interest here are the sections on alerts that span jurisdiction boundaries and alert updating, especially when an alert is about a moving threat or otherwise evolving situation. They also offer guidance about coding alert areas and providing useful text in the CAP description and instruction elements.

4. Privacy and Other Policy Considerations

4.1. Code of Conduct and Principles

FIA Partners that present public warnings are bound by the Network Advertising Initiative (NAI) Code of Conduct [24] and principles adopted by the Digital Advertising Alliance (DAA) governing the collection and use of data. [25] Especially relevant in the public warning context are provisions in the NAI Code of Conduct related to Interest-Based Advertising and DAA principles concerned with Online Behavioral Advertising.

4.2. No Personally Identifiable Information

FIA Partners will never collect or exploit personally identifiable information in any manner associated with their public warning activities.

4.3. Public Warnings Not Subject to Opt-out and AdChoices

The criteria for public warning (defined in section 3 above) are such that opt-out should not be offered as a user option.

In contrast to other online ads, a public warning through FIA messaging should not be accompanied by the "AdChoices" [26] standard industry icon, which is designed to inform users where ads are targeted to their interests. Instead, an information icon should be present in the upper right corner. If clicked, the in-banner overlay will state that the user has received the alert from the alerting authority because his/her device has been identified as being within the alerting area. Additional information could be accessible from the icon, such as specifics on policies and procedures entailed in the warning dissemination.

4.4. Geo-location Considerations

General geo-location of end-user devices in the alerting area during the time of a public warning is essential to the public warning activity and should not require user opt-in. However, "precise geo-location" does require user opt-in, as stated in the Network Advertising Initiative Code of Conduct.

4.5. Sharing Analytic Data on Warnings

Presenting warnings through FIA messaging opens the possibility to analyze in real time as well as post-event the effectiveness of any particular public warning effort. For instance, variations in click-through

rates might indicate that certain neighborhoods are being less responsive to a warning than others, which could then prompt immediate actions to provide additional messaging to certain audiences or to step up warning by other means. Accordingly, FIA Partners should be responsive to requests from alerting authorities for appropriate access to general/aggregated analytic data associated with public warnings through FIA messaging.

4.6. Non-proprietary Works

The text and design works used in the presentation of public warnings through FIA messaging should be licensed so as to allow the works to be freely copied and redistributed in any medium or format and allow others to transform and build upon the material for any purpose. These are characteristic of the Creative Commons license called "Attribution-ShareAlike 4.0 International". [27]

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Glossary of Terms

AdChoices - an icon served with certain online ads to provide clear and prominent notice of targeted advertising and linked to information about the tracking so that users may opt-out

ad server - networked computer providing advertising content customized to different user categories

canned text - static text prepared for repeated use under specifically agreed conditions

CAP (Common Alerting Protocol) - an XML-based data format for exchanging public warnings and emergencies between alerting technologies

creative - used as a noun in the advertising and communications industry to refer to a design work

FIA messaging - online communications by FIA Partners to convey public warnings in the event of an imminent threat, which may involve use of "ad servers" and other technologies normally used to disseminate advertising for publishers

HTML 5 (HyperText Markup Language version 5) - provides rules for structuring and presenting online a broad range of content, including scalable vector graphics

messaging - the practice of sending and receiving written communications by computer or mobile phone   [28]

online media - distributors of digital material online, especially including photos, video and audio

opt-in / opt-out - to choose whether or not to participate in something

personally identifiable information - information that can be used on its own or with other information to identify, contact, or locate a single person, or to identify an individual in context

pre-roll - an in-stream video that plays before user-selected content

symbology - a system of symbols

text crawl - text that appears across screen from one edge and disappears from the opposite edge

WEA (Wireless Emergency Alerts) - emergency messages sent by authorized government alerting authorities through mobile carriers

XML (eXtensible Markup Language) - a set of rules for encoding documents in a format that is both human-readable and machine-readable

End Notes

[1] The Common Alerting Protocol (CAP) is described very briefly in the Online Media flyer at http://www.wmo.int/pages/prog/amp/pwsp/documents/OnlineMediaCAP_Final.pdf (see also, https://www.wmo.int/pages/prog/amp/pwsp/CommonAlertingProtocol_en.html). The CAP specifications, versions 1.1 and 1.2, are available at http://docs.oasis-open.org/emergency/cap/.

[2] Google Public Alerts is described at https://support.google.com/publicalerts/.

[3] The Federation for Internet Alerts (FIA) website is at http://internetalerts.org.

[4] "Guide on Improving Public Understanding of and Response to Warnings" (WMO/TD No. 1139) is at http://www.wmo.int/pages/prog/amp/pwsp/pdf/TD-1139.pdf.

[5] "Guidelines on International and Cross-Border Collaboration in the Warning Process" (WMO/TD No. 1560) is at http://www.wmo.int/pages/prog/amp/pwsp/documents/TD_1560_PWS22_en.pdf.

[6] The standard "Criteria for Safety Symbols" (ANSI Z535.3-2011) can be purchased at http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI/NEMA+Z535.3-2011.

[7] Common Look and Feel Guidance for Canada's National Public Alerting System is at http://cradpdf.drdc.gc.ca/PDFS/unc129/p538116_A1b.pdf

[8] The website for MeteoAlarm is http://www.meteoalarm.eu/.

[9] The Report prepared by Nuwan Waidyanatha is available at https://sahana-wordpress.osuosl.org/wp-content/uploads/2013/05/report_waidy_CAP2013.pdf.

[10] An August 2012 announcement about the OCHA "Humanitarian and Country Icons" is at http://reliefweb.int/map/world/world-humanitarian-and-country-icons-2012. The announcement provides links to download the free symbols in various formats. It also notes an OCHA graphics style book that describes best practices, available at http://www.unocha.org/about-us/publications/thematic.

[11] A description of the Emergency Mapping Symbology developed for the Canadian government is at http://cms.masas-x.ca.s3.amazonaws.com/EMS_Symbology_v1.0.pdf . Icons (all sizes) are at http://cms.masas-x.ca.s3.amazonaws.com/EMS_Symbology_v1.0_full.zip.

[12] The website http://www.fgdc.gov/HSWG/index.html describes a set of symbols for public safety that was developed through 2005 by the Homeland Security Working Group of the United States Federal Geographic Data Committee.

[13] "The Evolution of Online Display Advertising" is offered by the Internet Advertising Bureau - UK at http://www.youtube.com/watch?v=1C0n_9DOlwE .

[14] Section 508 of the U.S. Rehabilitation Act is available at http://www.section508.gov/.

[15] The Web Content Accessibility Guidelines are at http://www.w3.org/TR/WCAG/.

[16] The Technical Advisory Note, titled "Preliminary analysis of file size constraints for Common Alerting Protocol (CAP) public alert messages in Canada", is at https://www.oasis-open.org/committees/download.php/45483/TechnicalAdvisoryNote-v11-fina(JP).docx.

[17] The international Register of Alerting Authorities is at http://www.wmo.int/alertingorg.

[18] The Alert Hub is described at http://alert-hub.appspot.com/ and a current list of AlertHub publishers is at http://alert-hub.appspot.com/publishers.

[19] "Imminent Threat Alert" criteria is in the United States Code of Federal Regulations (CFR), 47 CFR 10.400, available at http://www.law.cornell.edu/cfr/text/47/10.400.

[20] Requirements of "broadcast immediately" alerting in Canada is referenced in "Broadcasting Decision CRTC 2011-438" available at http://www.crtc.gc.ca/eng/archive/2011/2011-438.htm .

[21] The OASIS EM TC should be consulted whether notes in the CAP specification or a FIA Profile of CAP would be appropriate to make broadly known the rules applicable to public warnings through FIA messaging.

[22] *Example Practices: CAP Feeds Version 1.0.* 12 August 2013. OASIS Committee Note 01. http://docs.oasis-open.org/emergency-adopt/cap-feeds/v1.0/cn02/cap-feeds-v1.0-cn02.doc.

[23] *Example Practices: CAP Elements Version 1.0.* 12 August 2013. OASIS Committee Note 01. http://docs.oasis-open.org/emergency-adopt/cap-elements/v1.0/cn01/cap-elements-v1.0-cn01.html.

[24] The Network Advertising Initiative (NAI) Code of Conduct is at http://www.networkadvertising.org/2013_Principles.pdf.

[25] The Digital Advertising Alliance (DAA) Principles for Online Behavioral Advertising is available at http://www.aboutads.info/obaprinciples.

[26] The AdChoices web site is at http://ww.youradchoices.com .

[27] Creative Commons licenses are described at https://creativecommons.org/. The license "Attribution-ShareAlike 4.0 International" is at https://creativecommons.org/licenses/by-sa/4.0/ .

[28] "messaging." *Collins English Dictionary - Complete & Unabridged 10th Edition*. HarperCollins Publishers. 07 Apr. 2014. (http://dictionary.reference.com/browse/messaging)