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Related work:

This document is related to:

* *Common Alerting Protocol Version 1.2*. Edited by Jacob Westfall. 01 July 2010. OASIS Standard. Latest version: <http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.html>.

Abstract:

This Event Terms List has been developed for use with any version of the Common Alerting Protocol (CAP) or related systems.

The variety of practices employed regarding “event” types in CAP messages makes it difficult to compare messages from different sources. The problem has been presented as an interoperability issue where some consumers of CAP struggle to compare differences in language and meaning of the terms used in the <event> element in CAP.

The <event> element is the focus for this effort as it is the only required element in CAP directly associated with the subject event for a CAP message. Aligning practices surrounding this element, as opposed to other possible candidate elements, is the choice adopted in this work product for addressing this interoperability concern.

However, the <event> element is a free form text element meant to communicate with the final audience and not necessarily for the automated systems that process CAP. The only constraint on is that it be in the same language as indicated by the element in the block the <event> element is found in. Therefore, for consumers, the ability to rely on this element for uses other than just display is not possible.

With this in mind, the concept of a mapping table where CAP originators and CAP consumers can contribute “event” terms has been conceived. With this table, language terms can be mapped to each other as a reference for client consumers thus allowing some measure of interoperability to be possible.

Status:

This is a Non-Standards Track Work Product. The patent provisions of the OASIS IPR Policy do not apply.

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Introduction

The OASIS EMTC (Emergency Management Technical Committee of the Organization for the Advancement of Structured Information Systems), has developed a list of “event” terms for use in alert messaging systems. The list of terms attempts to help alert message consumers put some consistency into an important piece of information found in alert messages – the type of subject event.

A hazardous or concerning subject event justifies why an alerting authority created an alert message in the first place. It helps the authority anchor the information contained in the message to a specific time and place for the message audience. The subject event is essential to alert messages that use the OASIS CAP messaging standard.

The EMTC generated the “event” terms list in response to concerns expressed by the Global Disaster Preparedness Center (GDPC), a resource center hosted by the American Red Cross. The GDPC raised concerns that the varied and free form usage of event terms is inconsistent in CAP Services making it difficult to compare messages from different originating sources. As consumers of alert messages, they found there is no quick and definitive way to compare the language and meaning of the event terms found in various CAP messages.

Understanding this, the EMTC approach to the “event terms list” (referred to as the “list” in this document) has been to focus on “how” the list can help when comparing event terms. The design and management of the list is such that consumers of CAP messages, looking to compare event terms from different originating sources, will have a means to do so.

The EMTC also recognizes that many alerting authorities have their own terms; and that these terms, some long established, already work well in the communities they serve. Therefore, with the advent of the list, it is **not** suggested that alerting authorities change to using the OASIS event terms as listed, it is only suggested that the originating CAP systems for those authorities make a reference to the terms found in the list.

Understandably, the EMTC defers to each and every alerting authority their choice of terms. Those authorities have had many years to cultivate a relationship with their audiences and the EMTC has no wish to change that. The goal of the EMTC list is only to facilitate a more interoperable exchange of information to consuming parties that process alert messages from many authorities. Interoperability means that consumers, even those not associated with an alerting authority, should also be able process the message information in a standard way. With the methodology outlined in this document, the EMTC hopes this objective can be accomplished. The OASIS EMTC is asking CAP originators and CAP consumers to play a part in making this happen. Ultimately, OASIS hopes users like the GDPC will see the benefits.

Background - CAP Design

CAP is designed as a means to convey alerting information associated to a hazardous or concerning event of interest. It does this for the purposes of alerting audiences to the impacts of that same event.

Identifying an event of interest starts the process of creating an alert, with the event becoming the subject of discussion for each message of the alert. In CAP-based alerting systems, message originators employ CAP to house all the pieces of information associated to that subject event. Consumers of CAP messages, those considered partners to the alerting authorities, help disseminate and present that information to the intended final audiences.

Before a discussion on conveying event type information can be made, additional background is required on a variety of concepts pertaining to the alerting information - including the meaning of the terms “event” and “event type” as used in CAP.

## What is an Event?

An event is something that happens in a given place during an interval of time. It is the recognition of some activity that is a deviation from the normal state of things. An event only becomes significant when affected parties observe, or are anticipated to observe, some known measure of impact. On a very basic level, simply existing is enough for an event to generate interest. On a more practical level, authorities, with expertise on the nature of certain hazardous or concerning events, may classify an event as significant based on the real or anticipated impacts of the event.

In the case of “Public Alerting”, alerting authorities determine whether the impacts of an “event of interest” is concerning enough to issue a formal alert. This is their responsibility; and they can do this consistently because they have built up a pre-defined and deterministic cause for alarm based on a known set of conditions of similar events. In this situation, the alerting authority has assumed the role of defining the impacts of significance on behalf of the public audience they serve. An event, based on those measures, becomes the subject of an alert.

## Interoperability

CAP consumers are aware that some of the pieces of information within a CAP message are optional while some of the information is required. The <event> element within a CAP message is a required element. It is the only required element in a CAP message that by definition is directly associated with the subject event. Unfortunately, this has resulted in many CAP consumers attempting to rely on the element as a means of comparing the subject events across messages.

However, the <event> element is a free form text element meant to communicate with the final audience and not meant for the automated systems to process. The only constraint on <event> is that it be in the same language as indicated by the <language> element of the <info> block - but even that constraint is not easily validated. Therefore, for consumers such as the GDPC, the ability to rely on this element as currently defined, for uses other than display purposes, is not always possible.

Consequently, it is understandable that some believe that the varied use of the <event> element contradicts the concept of interoperability. One possible solution might be to have originators standardize the use of the <event> element to some standard list of values. However, it is the opinion of the EMTC, that the <event> element in CAP should not be re-purposed for this task. The <event> element has been established as an audience element and should remain as such. The EMTC believes other existing CAP elements should be employed to facilitate interoperability.

## What is a Type?

To “type” something is to declare something as sharing similar characteristics to things that went before it. If those characteristics create a classification, whether formally or informally, then a “type” is declared. One can then use a type in a sentence (i.e. “an object of type X”, or more commonly, “an X object”). This understanding is the basis for how “typing” works in any system.

For example, using a term like “apple pie”. The object of interest is a pie classified as being of type apple (as compared to other pies). The same concept exists when using a term like “hot pie”, the object of interest is still a pie but this time classified as being of type hot.

Both typing schemes in this example serve a purpose, but the type classification “apple” is more substantial than the type classification “hot”, as “hot” is open to wider opinion and interpretation. The difference extends from “apple” being a word that is able to describe another thing (a noun), whereas the word “hot” does not. The word “hot”, as used here, is simply a qualitative modifier (an adjective) that describes some quality of the object. This distinction is important.

When a noun functions as a type, like “apple” does in “apple pie”, it is referred to as a noun adjunct. Noun adjuncts are not the object in a sentence and only serve to modify another noun. Adjuncts as types generally make for easier type comparisons with other types as opposed to adjectives. For example, “apple” compared to “berry”, is an easier comparison to react to as opposed to “hot” when compared to “warm”. Comparing adjectives is more subjective. Typing strategies focusing more on noun adjuncts, and less on qualitative modifiers, often make comparisons easier to interpret.

Furthermore, as an additional advantage, noun adjuncts can have their own modifiers. For example, “red”, which is a modifier for “apple”, leading to the combination “red apple”, which is a more narrowly defined multi-word modifier for “pie”. Multi-word modifiers improve the precision of types, but conversely can also grow in number if left unchecked. Overuse can lead to lists too large to be manageable or effective.

This interpretation of type will figure prominently in this document.

## What is an Event Type?

When an alerting authority identifies a hazardous or concerning event as a “subject” event, it is helpful if the alerting authority and audience both have some prior understanding of the expected impacts of the event. That prior understanding comes from associating the subject event to a known event type. Defined event types assist in communicating to an audience the impacts of any single subject event.

The OASIS CAP standard defines the <event> element as… “the text denoting the type of the subject event of the alert message”. This means that the authority is not actually citing the subject event in the <event> element, only its type. For example, a subject event like “hurricane Katrina” would have an event type classification of “hurricane” as hurricane is the term given to events with conditions characteristic of a hurricane.

The full term in the context of this example is “hurricane event type”, where “type” is the object of the sentence, “event” is a permanent adjunct modifier to “type”, and “hurricane” is the actual event type being classified. Since the CAP standard established this element as “event type”, there is no need to repeat the words “event” or “type” in the list of types. NOTE: In the example, “hurricane” is also an adjunct describing the “event type”.

Using another example, the term “forest fire” is also an acceptable event type for alerting. Here, there are two noun adjuncts used to describe a more narrowly defined “event type” as opposed to using just “fire”. Another example of an event type is “ice”, and the more narrowly defined “thin ice”. The word “thin” however is a qualitative modifier and not an adjunct, and demonstrates the value that qualitative modifiers can occasionally bring to the task.

Multi-word types operate equally well or even better than single-word types. For example, a single-word event type of “emergency” is not acceptable for comparison purposes. Consumers wanting to compare this with other event types would welcome additional modifiers. The EMTC has to evaluate each case and use or limit modifiers as needed. NOTE: multi-word event types generally have an accepted best order in English (i.e. “forest fire” and “thin ice”, as opposed to “fire forest” and “ice thin”).

## What is an Alert?

An alert is a transmitted “signal” to [heighten](http://ardictionary.com/Heightened/2049) attention and/[or](http://ardictionary.com/Or/1924) initiate [preparation](http://ardictionary.com/Preparation/11009) [for](http://ardictionary.com/For/4655) action. For this attention and [preparation](http://ardictionary.com/Preparation/11009) to be meaningful, a real or anticipated subject event is necessary. As stated, it is by reference to this subject event that the alert ties the message found in the alert to a time and place.

For many alerting authorities, an event, simply by its event type definition, is an alert-able event. For example, a “dangerous animal” is an alert-able event simply because of what its event type definition is. For other authorities, the event is only significant and alert-able when a marked set of environmental conditions define its type. For example, an authority may declare a “wind” event an alert-able event based on a certain wind speed level marker. Regardless of how the need for an alert was determined, the authority went through a subjective analysis identifying event types of interest. All this so that the subject event for any given alert message has a type classification that aids in constructing alert messages for an audience.

## What is an Alert Type?

When constructing alerts, identifying subject events and event types is often not enough. Using meaningful terms for communicating hazardous or concerning impacts to an audience, is just as important. This is the social science of alerting and this is where the concept of an alert type arises.

An alert type is usually just the type of event transposed to also being the type of alert. For example, a “blizzard event”, of event type “blizzard”, would often lead to a “blizzard alert” of alert type “blizzard”. Since an alert message requires a subject event to center the message on, it is natural to make this simple transposition of event types to alert types. This transposition activity holds true for other event type schemes as well (i.e. a “red event” becoming a “red alert”, etc.).

However, the practice of setting an alert type for alerting authorities is just as inconsistent around the world as is setting event types. For example, a “hot dry weather” event, conducive to the possibility of bush fires, may result in alerts with alert types of “bushfire emergency” or “red flag warning”. These two alert types are not necessarily understood to mean similar things – especially across different communities.

Regardless of what event terms are already in use, and what they might truly signify, the overall social aspect of an alerting service has been established. Furthermore, for this exampled case, it should be pointed out that the alert terms “emergency” and “warning” are not uncommon variations for the choice of term for an “alert”, or is it actually meant to be a “bushfire emergency alert” of type “bushfire emergency”. Nevertheless, the conclusion is that the practice of using terms for naming events and alerts can vary considerably making comparisons difficult.

Ultimately, public alerting is not meaningful if the message is not understood. Regardless of the term assigned to the event or alert, the social responsibility of an alerting authority is to effectively communicate the hazards and concerns associated to a subject event. In each case, representatives of the alerting authorities that chose these terms felt the chosen term was the correct one for the situation.

## Event Terms

Since the inception of the CAP standard, event term usage in the <event> element in CAP based systems around the world has evolved to be wide ranging and varied. Alerting authorities, and their CAP originators, have fallen to a number of differing practices that makes comparisons of the <event> element values difficult. The list below is not a complete list of these practices but does demonstrate various interpretations and aspects of the larger problem of assigning an event term in CAP.

The list below is not a complete list but does demonstrate various practices and interpretations of the larger problem of assigning an event term in CAP.

1. The same event can affect different communities differently. For example, a “smoke” event can affect one community concerned with Air Quality and Health while at the same time it can affect another community concerned with Transportation.
2. The same event can affect a national community in one way and a local community in other ways. For example, a “forest fire” can affect logistical firefighting exercises on a large scale but cause evacuation activities on a smaller scale.
3. The same event may be easy to describe in one language but not another. For example, the term “AMBER alert” is well known in the English language but its direct translation may not easily survive into another language.
4. An event may be composed of many smaller events and the communication of many smaller events simultaneously may require the use of a broader term to get the message across. For example, “storm surge”, “heavy rain”, “strong winds”, “coastal flooding”, “tornadoes”, etc… may all be part of a “hurricane” event but an alert message full of references to the many smaller events may not be effective as they could overwhelm the audience. However, any of these smaller events occurring on their own could easily make up the subject event of a separate alert.
5. An event often comes with descriptive modifiers that authorities have used for many years based on a how the subject event was viewed in the past. The use of these descriptors can create confusion especially when compared against the established measures in the CAP standard. For example, a “thunderstorm” event and a “severe thunderstorm” event. “Severe” is one of several allowable CAP <severity> values used by agents to filter CAP alert messages, but if the value is set to “Extreme” and the event is still termed as a “severe thunderstorm” confusion can arise.
6. An event may be described differently in cause and effect situations. For example, an “earthquake” event that spawns a possible “tsunami” event may result in different originators referencing either event type in a CAP message. The alert is conveying a “Tsunami Warning” for an anticipated “tsunami” event but the cause event was the “earthquake” event. Alerting Authorities could focus on one, or the other, or the combination of the two, as the subject event of the CAP alert message
7. An event may be considered a trigger event by an alerting authority causing the authority to issue an alert focusing on a secondary event that they themselves want to initiate. For example, an “evacuation order” that contains a message that talks about the act of evacuating, and may involve very little discussion to the trigger event that spawned the order in the first place.
8. An event may be described by using a proxy term. For example, “red flag” is a term that can be used to describe an event where a triggering weather event is underway that is conducive to a secondary “fire” event occurring. Much like a “tsunami” event prompted by an “earthquake” event, the possible “fire” event is prompted by an existing “weather” event. However, in this case, the term “red flag” is a proxy term generalizing the possibility of several “fire” events.
9. Two event terms may have the same core term but be quite different types. . For example, a “bush fire” and a “chemical fire”. While related due to the core term “fire”, they are actually quite different event terms only connected through the broader term “fire”.
10. The event term wording may be a broader generalization than the actual intended meaning. For example, “air quality” as a term should have a broader definition than what is often implied as the more narrowly defined “poor air quality”. The repeated usage of the term “air quality”, for the purposes of issuing alerts for “poor air quality”, has led to a subtle training of the audience over time to interpret “air quality” as “poor air quality”.
11. An event term choice may be subject to the behaviors and constraints of the presentation systems in play. For example, the idea of keeping messages short for a particular presentation medium, or only including a short attention-grabbing <headline>. For example, “congestion ahead” designed specifically for an electronic road sign.
12. An event term may appear as a plural form, or verb form, or another form, instead of a simple noun. For example, an event type of “flood” may be expressed using terms such as “floods” or “flooding”.
13. An event term may not even be associated to an event at all. For example, “road”, “waste management”, etc… are terms that are not events on their own, but when used as a noun adjunct ahead of another noun like issue, situation, or service, the net result is an event term that is a very broad description of an event, but still a type of event.
14. An event term choice may include a scale reference. For example, a “UV index” event. UV is the actual concern and index is simply a mis-directed proxy for the true event, which may be a period of “dangerous UV radiation”.

Consequently, for an event terms list to be manageable and useable for automated comparison purposes, users of the list need to recognize that the EMTC list of terms is not able to accommodate all these interpretations. The EMTC list of terms will be an ever-growing list, but it will be a list of subject to a number of constraints to keep the list manageable.

## CAP Event Type Codes

One strategy to help automated systems that auto-process the delivery of the alert message to the final audience is to codify values for certain pieces of information in the message. Coded values, if formatted properly, can alleviate the dimension of language as an issue to resolve when processing an alert. Applying a code to each item in a list is desirable for automated systems and systems that deal across languages.

Codifying event types is also helpful for applying advanced processing in consuming alerting systems. For example, a coded value for a pre-defined event type allows consumers to have a pre-defined response to any alert message identifying to that event type. That response could be for simple tasks such as routing or filtering or it could be for more advanced tasks such as creating a unique presentation for a certain type of event. In CAP, originators populating the <eventCode> element help facilitate consuming responses by codifying event types.

## CAP-XML User Groups

A group is a collection of participants that share a common trait. In the case of XML, a language based messaging protocol, there are two basic user groups. One group is the final intended audience (the end clients of the information contained within the XML message), and the other is the partner group (the agents along the path of distribution that source the XML for decision making information). Both these groups are served by the same CAP-XML alert message.

There are elements in the CAP schema that are intended for one group or the other. For example, many of the free form elements in the CAP-XML schema are intended for the final audience, while many of the enumerated elements are intended for agents along the path of distribution. As stated, the <event> element is free form and conveys an event type to the final audience. Conversely, the <eventCode> element is a pre-determined element with managed values, and conveys an event type to agents along the path of distribution, allowing them to set up something specific in advance such as filtering or routing.

## CAP <category>

There is one additional event-based decision-making element in CAP. Unfortunately, like <event>, it does not come with much guidance on how to use it properly and existing practices with this element are as varied as the <event> element itself. Besides, it is a very general element and is not specific enough for consumers to use for most event comparison purposes. This element is the <category> element.

Like the <event> element, the CAP standard defines a <category> element to broadly categorize subject events referenced in CAP messages. The <category> element is a required element with a set of pre-defined values. Automated processing on the consumer side could potentially use <category> to filter to some sort of subset list of events of interest. Unfortunately however, consumers have to rely on the originators upstream to set the values appropriately and consistently if interoperability is the goal.

Furthermore, originators often just include one <category> for the hazardous or concerning event of interest in a CAP message, and that assignment usually just aligns with the jurisdiction of the alerting authority. This defeats the purpose of <category>. For example, an alert issued for a “volcanic ash” event may have a <category> assignment of only “Health” if a health agency issued the alert, whereas it may have a <category> assignment of only “Met” if a meteorological agency issued the alert. The recommended use of <category> is to have multiple instances of the <category> element present in the CAP message - one instance for each category that applies. The CAP consumer could then reliably use a filter to look for the categories that interest them and then just present the <event> value as is to the intended audience. If an alerting authority added a new event type to their list of alert-able events, a consumer could build a system filtered to <category> and not miss any new type of alert that the authority added.

OASIS is not intending to promote <category> as a solution to the <event> issue stated in the outset of this document, but understanding <category> and its traits, as compared to <event>, will help us address the event issue. The two important traits are re-listed here.

1. <category> is allowed to have multiple instances of the element in a single CAP message. Therefore, CAP does not constrain subject events to being in only one category. The <event> element however is constrained to one value.
2. <category> is a pre-set broad categorization, not enough to inform on the full nature of the event. Therefore, consumers can use it to filter alerts only at the broad scale. The <event> element as broad or narrow as needed for the audience of interest

These two differences figure in the methodology to solve the event type comparison issue discussed in this document.

Event Term Spectrums

As mentioned earlier, the social aspect of alerting is a primary concern for alerting authorities. The chosen terms used in an alert message exist for the purposes of communicating effectively with an audience. However, when inspecting the terms used across various systems, not surprisingly, a wide range of terms are used. Upon further inspection, the terms are not just similar terms for the same thing, but terms that span a wide range across one or more spectra of terms. This happens both at the event level and the alert level and even authorities themselves sometimes have a hard time interpreting one another’s choice of terms.

The following is discussion on terms across spectrums. This will factor into the decisions made regarding what event terms may make it into the list.

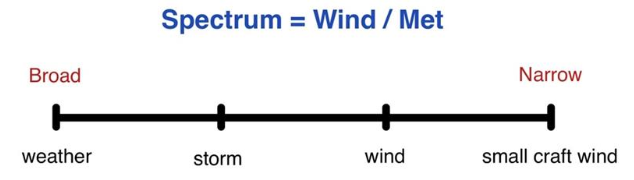
## Broad to Narrow Spectrum

Terms can be very specific or very general depending on the information that needs to be conveyed. This is especially true for public alerting. For example, usually the term used for an event is often the same term used for the alert (i.e. a “wind” event leading to a “wind warning”). However, some alerting authorities generalize the type of alert by using broader terms (i.e. a “wind” event leading to a “wind” alert). Alerting authorities may choose to broaden the chosen event and alert terms for many reasons. For example, these include, but are not limited to…

* alerting for fast changing situations, where the event type is subject to change in updated messages over time (i.e. a “rain” event, changing to a “sleet” event, changing to a “snow” event and then back again, can be collectively referred to as a “winter storm” event)
* alerting to reduce message fatigue and confusion of an audience, where the audience might otherwise be subjected to different event terms for similar events

Furthermore, if a combination of events tends to occur at the same time due to the connected nature of the events, alerting authorities often use broader terms used as a catchall for the individual events (i.e. a “wind” event, plus a “rain” event, plus a “storm surge” event all associated to a “tropical storm” event). From any one physical location, for a segment of the audience affected by all these individual events, the event term “tropical storm” makes sense as a catchall term for the alert message. However, for a segment of the audience affected by only a subset of the events, such as those on higher ground, should they be subjected to the messaging of the “storm surge” component of the catchall term?

The example below shows a simple example of “wind” that includes the CAP category “Met”.



An authority could elect to use the broad event term “weather” or the narrow term “small craft wind” when naming an event. For example, the following combination of CAP elements is possible

<event> = “weather”  
<category> = “Met”

as well as…

<event> = “wind”  
<category> = “Met”

or even…

<event> = “small craft wind”  
<category> = “Met”

and so on.

Additionally, reference terms can appear on more than one broad to narrow spectrum. This is one area where the <category> discussion above is relevant. For example, using the “smoke” example from earlier, smoke is a broad term that one can narrow to “dense smoke”, affecting Transportation, or “chemical smoke”, affecting Air Quality and Health.

Timeline, box and whisker chart

Description automatically generated

Timeline, box and whisker chart

Description automatically generated

The impacts of a “smoke event” could be associated to two different CAP <category> values, “Health” and “Transport”. In this case, the broad term would need more context if there were a consumer that wants to filter for alert messages in just one of either category.

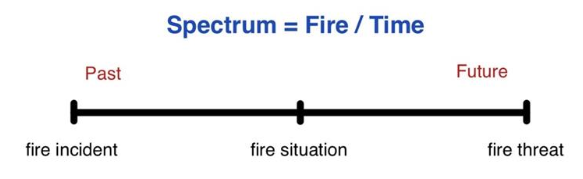
Furthermore, if the “dense smoke” is from a chemical fire, and the alerting authority is issuing an alert for this smoke with both the Health and Transport communities in mind, do they issue two alerts or one? Do they issue a general alert message discussing impacts of both, or two alert messages discussing the impacts in each category knowing there may be a separate audience for each category?

Practices are many and varied and often go to how the authority conveys the impacts in the message. OASIS has no jurisdiction over such alerting practices leaving that up to the authorities themselves, but the practices affect the terms used.

## Time Spectrum

Alerts can be used to alert audiences to events of interest that have happened, are presently happening, or are expected to happen in the future. If an event is moving, such as a “storm”, it can be considered happening now to some and happening in the future to others. Furthermore, if an event is only anticipated to happen, it may end up not happening if the conditions leading up to the event change before the anticipated event happens. All this can affect the chosen terms used to describe an event across the time spectrum.

Consider for a moment a term like “forest fire”. Since a forest fire is an event by its nature, something that deviates from the normal condition of no fire, the term “forest fire” is an acceptable event type term. However, if an authority wants to define forest fire types for both “existing” forest fires, and “future” forest fires, how is that accomplished? Terms such as “forest fire situation” or “forest fire threat” come to mind, along with many others similar terms. When inspecting these choice of terms, a sense of timing can be inferred by the additional word in the term. The word “situation” suggests a current event and the word “threat” suggests a future event. For completeness, a word like “incident” could be used for a past event.



An important observation for terms like… incident, situation, threat, etc…is that these terms on their own without a modifier can convey the idea of an event (i.e. a simple message stating, “there is a threat” refers to a “threat” as the subject event). Such events are abstract, as opposed to real, but abstract events do not contravene the idea of a subject event.

When it comes to typing abstract events in CAP, the word “threat” is still a noun. As a noun adjunct to the base word event, it too may also be typed. Using the example above, the net result could be a multi-word event of type “fire threat”, or the even more narrowly defined “forest fire threat”.

The term “threat event”, does not provide anything helpful on its own for comparison purposes other than timing. Furthermore, if a qualitative modifier is used, such as “strong threat”, it still does not provide anything helpful for comparison purposes. Abstract events, like timing spectrum events, are best served with another adjunct as a modifier instead of qualifying modifiers. With “fire threat”, there is both tangible information on the hazardous or concerning event plus information on the timing.

One advantage of adding timing spectrum words to the term is that they aid in pre-planning shorter audience messages when length of message is a concern. Another advantage is that the noun adjunct for words like threat, situation, incident, etc… does not necessarily have to convey a sense of an event because threat, situation, incident, etc… already do.

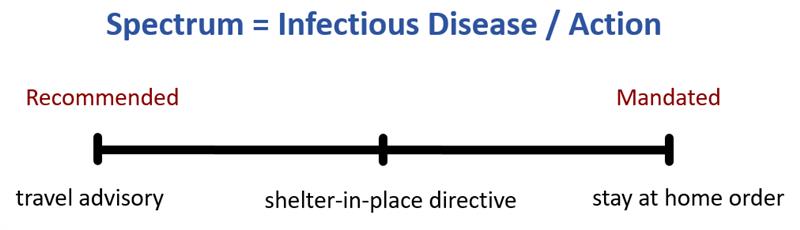
## Impact Spectrum

Alerts can be used to alert audiences to events of interest that have impacts that are minor, major, or anywhere in between. Often, the desire of many alerting authorities is to express that degree of impact quickly and succinctly as possible. In CAP, this is what the <headline> element is designed for; however, another way to do this is to encapsulate the degree of impact into the event type term. If an event type has an additional adjunct in the term that infers some sense of impact, such as “concern”, “problem”, “issue”, “hazard”, “emergency”, etc… then simply presenting the event type may be enough to get enough of the message across in presentation mediums where succinctness is key. Timeline, box and whisker chart

Description automatically generated Much like time-based terms, impact-based terms on their own are abstract. They convey the idea of an event and do not contravene the idea of a subject event in a CAP message. Impact-based terms come with the same advantages of time-based terms. For example, a “beach hazard” is an acceptable event type when “beach” on its own is vague for comparison purposes. Even the implied full event term “beach event” is vague - it really only answers the question of where, as opposed to what. Adding in the impact term “hazard”, as in “beach hazard” (or “beach hazard event” - as implied) makes the term much more helpful.

## Action Spectrum

On occasion, alerting authorities use alerts to engage an audience to take action as a secondary event in response to some primary triggering event. The action requested by the alerting authority can range from monitoring for more information; evacuating the area; sheltering in place; or engaging in specific actions intended for the well-being of the individual or community. These secondary events may be simple recommendations or mandated orders to do something specific.



The COVID-19 pandemic re-acquainted world to “stay-at-home order” alerts. These alerts were becoming common during the pandemic and alerting authorities were becoming very prescriptive in their alert naming to get the message across. Rather than issuing hundreds of alerts, all referred to as “COVID-19” alerts or “infectious disease” alerts, authorities altered the wording and named the alerts to such things as “stay-at-home order” and “fake vaccine warning”. As an alert type, their names directed the audience to the secondary event cited.  
The corresponding event type could still easily be “infectious disease”, but a modified situation occurs where authorities are instead inspired to cite the secondary event as the event type, but that argument is a based on the mis-conception that the event type and alert type should be the same thing.

Other action spectrum examples are “advisory”, as with “travel advisory”, “alert” as with “AMBER alert”, “orders” as with “boil water order” and “evacuation order”, etc… Even “warning” as with “weather warning” is an example of this. In this latter example, the word “weather” is an adjunct to warning, meaning the event of interest is the warning itself and the audience engagement of the information they have just received, not the real or anticipated weather that triggered the alert.

The term “AMBER Alert” is an alert type created to heighten the awareness of the secondary response event that involves the participation of the audience. There is no actual secondary event unless some or all of the audience takes part. NOTE: AMBER is an acronym for “America’s Missing: Broadcast Emergency Response” where the idea is to illicit a response by the audience. The word “alert” is added to distinguish the acronym from the color amber if heard or seen in a message.

The recommended approach in CAP for secondary action events is to keep the <eventCode> element tied to the triggering event for comparison purposes; use the <headline> element for the alert type referencing the secondary event; and use either option for the <event> element as preferred by the alerting authority. Using the examples above, the text snippet “stay-at-home order” or “AMBER Alert” would appear as part of the <headline>, with the “infectious disease” code or “missing persons” code indicated in the <eventCode> element. As for the <event> element, either “stay-at-home order” and “AMBER Alert” as references to the secondary event, or “infectious disease” and “missing person” as references to the triggering event.

## Intersecting Spectrums

Spectrums can intersect. This becomes important when trying to compare terms from across spectrums. For example, if one alert message uses an event term, that includes a narrow time modifying term; and another alert message uses a broad impact modifying term, how difficult is it for automated systems to compare the two terms? For example, an event type term like “weather threat” as compared to an event type term like “hurricane emergency”.

Furthermore, there are subject events where the individual event type terms incorporate concepts from two different spectrums (i.e. “fire threat emergency”). When intersecting spectrums are used, it increases the difficulty of comparing terms across messages.

Spectrum Concept

Bearing in mind the previous discussions, a sub-committee of the EMTC has attempted to compile a reference list of event type terms that alerting authorities and originators can use or reference in CAP alert messages. The concept of a term being part of a spectra of terms was established. The EMTC will use the concept as a way to help facilitate the ongoing task of incorporating and managing new terms over time. Users of the list will not necessarily have to be familiar with the spectrum concept, but it will help. Contributors to the list will hopefully have a better understanding of how their submission is being treated if they understand the spectrum concept.

A spectrum, in the context used here, where a grouping of terms is brought together under one defined range, provides a means of comparing terms. With that, a number of concepts arise with respect to spectrums. They are introduced and discussed below.

## Chosen Spectrums

Identifying a Spectrum begins with identifying a primary term (i.e. wind) and a broad term (i.e. Meteorological) and pairing them together to establish a range. The primary term needs to be an adjunct (another thing) otherwise the spectrum does not have a basis for comparison. The broad term will come from the list of CAP categories where the CAP category term applies. For example, “wind” is paired with “meteorological” creating one spectrum, whereas, “wind” is not paired with “security” as no identified pairing term is known at this time. NOTE: The CAP category CBRNE is broken up into its five constituent components for this exercise. The secondary event category “rescue” is fine for a broad-spectrum end point as a “rescue issue” is interpreted to mean an issue came up during a rescue event unrelated to the trigger event (i.e. “suspended search”)

## Related Terms

For every event term, there are other related event terms that others may feel are better terms to use. This is of course a matter of opinion, but in a spectrum approach the EMTC can show a given term as relatable to other terms simply by being in the same spectrum. For example, if a reference term falls onto one or more broad to narrow spectrums, all terms on those spectra are considered related terms.

## Narrow Terms

How narrow (or specific) do event terms need to be? For example, a term for every intensity rating on the Enhanced Fujita Scale (EF0 to EF5), each based on the likely damage expected with a tornado event, could arguably help consumers better understand the threat. However, would the majority of agents along the public alerting path of distribution use the distinction? Unlikely.

If an <eventCode> existed for each narrow term, the audience experience could be enhanced as the narrower term increases the precision of the message. However, it is usually only a smaller subset of the audience that has a need for such specificity.

In the tornado example given, the term is actually the code itself (i.e. “EF0”). However, for other scales, such as a marine scale for wind speeds where a modifying term is used (i.e. small craft wind = 15-19 knots, strong wind = 20-33 knots, gales = 34-47 knots, etc…), the discussion remains relevant.

In such cases the EMTC purposely does not venture into the very narrow edge of the spectrum. The feeling is that the general public would be better served, as with the first example, by the event term “tornado”, or in the second example, by the event term “wind”. For those looking for more specificity of scale, the “Other Lists” section below does offer up a complimentary solution that CAP can easily accommodate.

## Terms vs. Preferred Terms

Preferred terms, within a spectrum of terms, is a matter of opinion. The EMTC will not concern itself with choosing a preferred term. Alerting authorities are free to choose their preferred term when considering their audiences. The list however makes it possible to compare the terms used with other terms preferred by other authorities.

## Other Language Terms

Other language terms are considered to be in the same spectrum. Spectrums are language independent. If a term is used in one identified language, and it has an equivalent term in another identified language, it is a related term. Filters by language can be used to when working in one language (viewing the list), or when using the list to translate from one language to another (processing CAP with the help of the list).

## Other Word Forms

Other word forms of a term introduce other possible spectrums to consider. Plural forms, verb forms, ideological forms, etc..., all add extra meaning to a term. For example, “floods”, “flooding”, and “flooded” all add context to the term flood. As a type however, they do not add to the base term flood. Additionally, the base term flood does not preclude the notion of multiple floods; nor does it imply the state of the flood during the event. These variations do not serve any benefit when comparing events except in exceptional cases. The EMTC is creating a list of event types for general comparisons, not exceptional cases.

## Other Lists

CAP has the facility to house term references from more than one list in any single CAP message. The <eventCode> element is a multi-instanced element in CAP, specifically defined to allow for codes from many different lists to be simultaneously incorporated into a message. For that reason, the EMTC has decided not to include terms and codes based on preferences or specificity of scale, leaving that exercise up to sub-communities of users to define their own lists.

Any such community is welcome to define and publish additional event term codes. Those additional codes, if necessary, can easily cover the narrow edge of the broad to narrow spectrum. For an alert message that goes out to a multitude of consumers, serving both specific and general audiences, an additional event code could convey the preferred or specific details to subset audiences and the EMTC code could convey general details to general audiences.

Event Terms List

As mentioned in the outset, the EMTC has developed a list of “event” terms for use in alert messaging systems. There was no shortage of challenges with this initiative. Determining how to build and structure the list first meant understanding the bulk of the problems the list was intended to solve. Also, stewards of the list, as well as users of the list, would each have their own objectives when working with the list. Furthermore, how to apply and present the list afterwards to all users was also difficult since many existing alerting practices are already underway and had to be accommodated for in the methods chosen.

**For users**, the EMTC list was developed to be open-ended. An open-ended approach is considered evergreen – the resulting material retains its relevance by growing continuously to meet the needs of a community. For the sub-committee, managing an open-ended reference list, where new terms can be submitted over time, is possible, but only when a solid evaluation process for upkeep is established. This is possible with the concept of spectrums.

Secondly, strategies such as a thesaurus approach emerge. With a thesaurus approach, each term is related to other similar terms and by selecting one term, other similar or related terms can be found using the various spectra the term can be found in. The thesaurus then leads the user down a path where the user can choose for themselves the best term as they deem appropriate for the situation. Through the spectrum approach, the EMTC will be able to list related terms for any given reference term when using a thesaurus.

**For consumers** of CAP, the <event> element is free form, and consumer systems should already be accepting free form values for this element. The consuming systems should not require any refactoring if the terms from the EMTC list start to appear in CAP messages. This of course assumes consumers use the <event> element for what it was intended – as a display element only.

Secondly, for consumers that want more – that want the ability to auto-process and compare event types across systems and platforms – the EMTC is suggesting an alternative procedure requiring the cooperation of CAP originators and consumers alike. The EMTC is asking originators to populate at least one instance of the <eventCode> element with a code value from the EMTC list – the value that most closely represents the event type used by the alerting authority. For example, if the alerting authority has an established event term, and it closely mirrors an EMTC term, the following should be placed into any associated CAP alert message.

<eventCode>  
 <valueName>OET:v1.0</valueName>”  
 <value>OET-537</value> --a coded value of the closest EMTC event term   
</eventCode>

If a term does not closely resemble any EMTC term, then following should be used.

<eventCode>  
 <valueName>OET:v1.0</valueName>”  
 <value>OET-000</value> --a coded value for the EMTC event term “other event”  
</eventCode>

**For alerting authorities,** if one does not already have their own list, one may freely use the terms from the EMTC list. If one already has their own event terms list, the EMTC requests a mapping of those terms to equivalent terms in the EMTC list by the alerting authorities and CAP originators when generating an alert message (as exampled above). The sub-committee will periodically expand the list and release updated versions.

Secondly, the EMTC is also asking authorities to submit terms for inclusion into the list. As mentioned, the sub-committee will periodically expand the list but will only do so acting as a custodian of the list rather than the subject matter experts for the terms on the list. If there is a situation where the “other issue” coded value is used in a CAP alert message, then the native event type used in that message is a candidate for inclusion on the EMTC list going forward.

## Submitted Event Terms

The following is the general procedure used when considering a new term for inclusion into the list.

* A submitting agency identifies an event term for submission
* The submitting agency identifies one or more CAP categories for the event term (to set the broad edge of the spectrums of interest)
* The EMTC assesses whether it is truly an event type term or not (based on the earlier discussions)
* The EMTC assesses whether it truly fits the spectrums or not
* Once accepted the term will be added to the list
  + It will be roughly ordered within the indicated broad to narrow spectra
  + It will be assigned a new EMTC event term code if it has no sibling term
  + It will be assigned an existing EMTC event term code if it has a sibling term
* All other terms in the associated spectra will be considered related terms
* Suggestions for other language terms will be accepted and added
  + Equivalent other language terms will be considered sibling terms

The sub-committee will only review the terms as indicated above. For that, we need the help of the submitting agency - either the alerting authority itself or an agency on behalf of an alerting authority.

## What Event Terms OASIS Will Accept?

The list below demonstrates what OASIS will accept…

1. event type terms that convey a sense of time and space.
2. event type terms that fall within a broad to narrow spectra of terms.
3. multiple event type terms in different languages for a single event type.
4. event type terms that are used to service multiple user communities, regardless of the number of authorities it affects.
5. event type terms that are regional event terms (i.e. “monsoon”).
6. event type terms that are proxy terms (i.e. “AMBER Alert”), if the proxy term is well associated to an event type.
7. event type terms that are multi-word terms (i.e. “falling object”) where the multi-words are needed to convey the concept of an event.
8. eventtype terms that collectively subsume a number of smaller events (i.e. “tropical storm” which may subsume “wind”, “rain”, “high seas”, “flood”, etc…).
9. event type terms that are secondary event terms when the secondary event is truly the subject event (e.g., “boil water advisory”, “evacuation order” or “AMBER alert”). The secondary event is what the alerting authority is truly directing the attention of the audience (for AMBER Alert, that secondary event is the search for the missing child, as opposed to the original abduction event that triggered the AMBER Alert).
10. new spectrum mappings to existing terms (i.e., adding terms to other spectrums).

## What Event Terms OASIS Will Not Accept?

The list below is not a complete list of ideas applicable to the process of **not** accepting event terms, as new ideas may emerge, but the list does example what OASIS will **not** accept…

1. terms not associated to an event on their own (i.e., “terrorism).

The term “terrorism” is not associated to an event, as it is an ideology. Consequently, the implied full term “terrorism event” does not even suggest a CAP category as it could be any of them making it difficult for comparison purposes of events. NOTE: “terrorist incident” is in the event terms list as an event type as it suggests a CAP category of “Safety”. NOTE: This explanation is not necessarily directly applicable to all languages; however, the intent still applies.

1. terms that are actually secondary event terms that are often mistaken as a primary event term. (i.e. “thunderstorm warning”).

The term “thunderstorm warning” is a secondary event term that refers to the act of responding to a warning, not the real or anticipated presence of a thunderstorm event itself. With all possible secondary event terms making a long list of terms, it makes it difficult to manage a list of terms for comparison purposes. Furthermore, such secondary events are not what the CAP elements, <severity>, <onset>, etc. were designed to address, although many authorities just use a value representative of the primary event. However, in this case, the primary term “thunderstorm” will suffice as it makes comparisons and list management easier.

1. terms that are multi-word terms that use a modifier to classify an event by scale rather than distinguish the event from another event by its nature (i.e., “gale force winds” and “hurricane force winds” are derived terms based on a level marker). However, the terms “chemical fire” and “forest fire” would be accepted separately as the nature of the two events are quite different. Therefore, the terms “gale force wind” and “hurricane force wind” are not considered for the OASIS event terms list, but the term “wind” is acceptable. NOTE: Communities, such as marine based communities, are welcome to establish a set of terms and codes for scale based terms with the recommendation that those generally narrower terms be mapped to the closest more general OASIS term (and associated event code). Originators of CAP messages for these events are asked to include a reference to the OASIS event code in one instance of the multi-instanced CAP <eventCode> element.
2. terms that are multi-word terms where the modifier is a general reference to a scale. For example, “UV index”, which has an implied level marker scheme based on the word “index” but by its presence in an alert message implies an event out of the ordinary. Therefore, the term “UV index” is not considered acceptable for the list, but the term “UV” is.
3. proxy terms that are otherwise not event terms (i.e., “red”).

Red is not an event on its own, it is a quality tied to an impact scale. “Red” may be used by the authority in the <headline>, <description>, <parameter> or other elements as an alerting authority based preferred term but as an event these terms do not convey the idea of an event and make comparisons difficult. Multi-word terms that try to make an event out of a proxy event (i.e., “red issue”) are also not accepted, as this assumes a scale-based term. Turning the proxy term into an event in this manner provides no context to the term event as the definition of red on its own is a color. NOTE: Communities, such as public alerting based communities, are welcome to establish a set of color based terms and codes, however, originators of CAP messages are asked to also include a reference to the OASIS event code in one instance of the multi-instanced CAP <eventCode> element based on the actual event.

1. terms tailored for a specific dissemination channel or display medium (i.e. “congestion ahead”).

Channel based terms are often tailored and leave out details. For example, an electronic road sign that says “congestion ahead” assumes the audience understands the context of viewing the message while driving. Such messages are actually private messages, built for a specific channel; the information is still public, only the tailoring is private. Without the context of the display medium, the event type becomes vague and difficult for comparison activities.

1. terms that are plural, verb, or other word forms of an event term (i.e. “floods”, “flooding”, “flooded”, etc…).

Unless the natural form of the term is in one of these forms, “floods”, “flooding” and “flooded” do not imply anything more as an event type than does just the word flood. Flood is actually more versatile as a corresponding alert type as the alert can pertain to all these variations. The various forms of the word flood are free to be used in other event typing schemes; however, the EMTC list will constrain such entries to its base form.

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1. OASIS Event Terms

The OASIS event *code* value is for use in the cap.alertInfo.eventCode.value element

Note: “OET” represents “OASIS Event Term”

The version of the OASIS Event Terms list that the OASIS event code is taken from is indicated in the cap.alertInfo.eventCode.valueName element.

Note: It is of the form "OET:*m.n*", where "*m.n*" is the major.minor version of this document.

The OASIS event *term* is for use in the cap.alertInfo.event element

Note: The OASIS Event Term is supporting material for comparison purposes and for systems that have no Event term list.

The "Grouping" column is used to indicate other CAP Event terms which are related.

Note:  Most often, the grouping term is a broad grouping term on the broad to narrow spectrum, where the term on the row is a more specific term on the same spectrum. The Grouping term can lead to other related terms if the given Event term "doesn't quite fit" the situation.

The CAP Category Code(s) value is for use in the cap.alertInfo.category element

Note: The "CAP Category Code(s)" column, lists the known CAP Categories the OASIS Event term is associated, and OASIS recommends all values listed should be included in the multi-instanced cap.alertInfo.category element in a CAP message.

| OASIS Event Code | OASIS Event Term | Grouping | CAP Category Code(s) |
| --- | --- | --- | --- |
| OET-000 | other | other | Other |
|  | accumulating ice | safety | Safety; Transport |
|  | active shooter | criminal activity | Safety; Security |
|  | administrative action | testing & system activity | Other |
|  | air hazard | aviation hazard | Meteorological; Transport |
|  | poor air quality | health hazard | Environmental; Health |
|  | stagnant air | air hazard | Meteorological |
|  | aircraft crash | aviation hazard | Transport |
|  | aircraft incident | aviation hazard | Transport |
|  | airport closure | aviation hazard | Transport |
|  | airspace closure | aviation hazard | Transport |
|  | airspace restriction | aviation hazard | Transport |
|  | ambulance | health issue | Health |
|  | animal disease | health issue | Health |
|  | animal feed | health issue | Health |
|  | animal health | health issue | Health |
|  | arctic outflow | temperature hazard | Meteorological |
|  | ashfall | air hazard; marine; aviation | Geological; Health; Meteorological; Safety; Transport |
|  | avalanche |  | Geological |
|  | aviation hazard | aviation hazard | Transport |
|  | aviation security | aviation hazard | Transport; Security |
|  | beach hazard | marine | Safety |
|  | biological | biological hazard | CBRNE |
|  | blizzard | winter weather | Meteorological |
|  | blood supply | health issue | Health |
|  | blowing dust | air hazard | Meteorological |
|  | blowing snow | winter weather | Meteorological |
|  | blue-green algae | water hazard | Environmental |
|  | bomb threat | criminal activity | CBRNE |
|  | bridge closure | road hazard | Transport |
|  | bridge collapse | road hazard | Transport |
|  | building collapse | infrastructure issue | Infrastructure |
|  | building structure hazard | earthquake | Geological |
|  | bush fire | fire | Fire |
|  | cable service issue | utility issue | Infrastructure |
|  | canal issue | utility issue | Infrastructure |
|  | chemical fire | fire | CBRNE; Fire |
|  | chemical hazard |  | CBRNE |
|  | chemical smoke |  | Health; CBRNE |
|  | child abduction | criminal activity | Safety; Security |
|  | Civil issue | civil issue | Security |
|  | civil protest | civil issue | Safety |
|  | coal gas | utility issue | Infrastructure |
|  | coastal flood | flood | Meteorological |
|  | cold | temperature hazard | Meteorological |
|  | cold weather | winter weather | Meteorological |
|  | communications service disruption | utility issue | Infrastructure |
|  | contagious disease | health hazard | Health |
|  | contaminated water | health hazard | Health |
|  | contamination |  | CBRNE; Health |
|  | criminal activity | criminal activity | Safety |
|  | cybercrime threat | criminal activity | Safety; Security |
|  | cyclone | tropical storm | Meteorological |
|  | dam break | flood | Geological; Meteorological |
|  | dam issue | infrastructure issue | Infrastructure |
|  | dangerous animal | civil issue | Safety |
|  | dangerous person threat | criminal activity | Safety |
|  | debris flow | geophysical | Geological |
|  | demonstration | testing & system activity | Other |
|  | dense fog | air hazard | Meteorological |
|  | dense smoke | air hazard | Meteorological |
|  | diesel fuel issue | utility issue | Infrastructure |
|  | disease | health issue | Health |
|  | disease outbreak | health issue | Health |
|  | drought | weather | Meteorological |
|  | drug safety issue | public health | Health |
|  | drug supply issue | public health | Health |
|  | dust storm | air hazard | Meteorological |
|  | dyke break | flood | Meteorological |
|  | earthquake | earthquake | Geological |
|  | electronic infrastructure issue | infrastructure issue | Infrastructure |
|  | emergency responder incident | criminal activity | Safety |
|  | emergency responder threat | criminal activity | Safety |
|  | emergency support facilities incident | infrastructure issue | Infrastructure |
|  | emergency support services incident | infrastructure issue | Infrastructure |
|  | emergency telephone outage | infrastructure issue | Infrastructure |
|  | environmental issue | environment | Environmental |
|  | explosion threat | civil issue | CBRNE |
|  | falling object | safety hazard | Safety |
|  | fire | fire | Fire |
|  | flash flood | flood | Meteorological |
|  | flash freeze | winter weather | Meteorological |
|  | flood | flood | Meteorological |
|  | fog | air hazard; winter weather | Meteorological |
|  | food contamination | biological hazard | Health |
|  | food safety issue | public health | Health |
|  | food supply issue | public health | Health |
|  | forest fire | fire | Fire |
|  | freeze | winter weather | Meteorological |
|  | freezing drizzle | winter weather | Meteorological |
|  | freezing rain | winter weather | Meteorological |
|  | freezing spray | winter weather; marine | Meteorological |
|  | frost | winter weather | Meteorological |
|  | fuel issue | utility issue | Infrastructure |
|  | geophysical issue | geological | Geological |
|  | grass fire | fire | Fire |
|  | hail | severe weather | Meteorological |
|  | hazardous seas | marine | Transport |
|  | health issue | health issue | Health |
|  | heat | temperature hazard | Meteorological |
|  | heating oil issue | utility issue | Infrastructure |
|  | high seas | marine | Meteorological |
|  | high surf | marine | Meteorological |
|  | high tide | marine | Transport |
|  | high water | utility issue; marine | Infrastructure; Transport |
|  | home crime | criminal activity | Safety |
|  | humidity issue | temperature hazard | Meteorological |
|  | hurricane | tropical storm; tropical cyclone | Meteorological |
|  | ice | winter weather | Meteorological |
|  | ice pressure issue | ice issue | Meteorological |
|  | ice storm | winter weather | Meteorological |
|  | iceberg | ice issue | Meteorological |
|  | industrial crime | criminal activity | Safety |
|  | industrial facility issue | safety hazard | Safety |
|  | industrial fire | fire | Fire |
|  | infrastructure issue | infrastructure | Infrastructure |
|  | internet service issue | utility issue | Infrastructure |
|  | lake effect snow | winter weather | Meteorological |
|  | lake wind | air hazard | Meteorological |
|  | landline service issue | utility issue | Infrastructure |
|  | landslide | geophysical | Geological |
|  | law enforcement issue | civil issue | Security |
|  | levee break | flood | Meteorological |
|  | lightning | thunderstorm; severe weather | Meteorological |
|  | limited visibility | air hazard | Transport |
|  | low tide | marine | Transport |
|  | low water | utility issue; marine | Infrastructure; Transport |
|  | low water pressure | utility issue | Infrastructure |
|  | meteoroid | space | Transport |
|  | meteorological issue | meteorological | Meteorological |
|  | missile threat | national hazard | CBRNE |
|  | missing child | safety hazard | Safety |
|  | missing person | safety hazard | Safety |
|  | mobile communication issue | utility issue | Infrastructure |
|  | monsoon | weather | Meteorological |
|  | mudslide | geophysical | Geological |
|  | natural gas | utility issue | Infrastructure |
|  | network message notification | testing & system activity | Other |
|  | nuclear power plant issue | infrastructure issue | Infrastructure; CBRNE |
|  | oil leak | beach hazard, environmental | Environmental |
|  | oil spill | beach hazard, environmental | Environmental |
|  | overland flood | flood | Meteorological |
|  | pipeline rupture | utility issue | Infrastructure |
|  | plant health issue | health issue | Health |
|  | heavy rain | health issue | Health |
|  | pollen | health issue | Health |
|  | potable water issue | utility issue; water hazard | Infrastructure |
|  | power outage | infrastructure issue | Infrastructure |
|  | power utility issue | utility issue | Infrastructure |
|  | product safety | safety hazard | Safety |
|  | public facility issue | infrastructure issue | Infrastructure |
|  | public health | health issue | Health |
|  | public service issue | infrastructure issue | Infrastructure |
|  | public transit issue | infrastructure issue | Transport |
|  | pyroclastic flow | volcano hazard | Geological |
|  | radiation issue | radiological hazard | CBRNE |
|  | radio transmitter | safety hazard | Infrastructure |
|  | radioactive material release | radiological hazard | CBRNE |
|  | radiological fire | fire | CBRNE; Fire |
|  | railway issue | infrastructure issue | Transport |
|  | rain | weather | Meteorological |
|  | rapid ice closing of water passage | ice issue | Transport |
|  | red tide | health issue; marine issue | Health |
|  | rescue | rescue | Rescue |
|  | retail crime issue | criminal activity | Safety |
|  | rip current issue | beach hazard | Safety |
|  | road closure | road hazard | Transport |
|  | road issue | road hazard | Transport |
|  | road vehicle accident | road hazard | Transport |
|  | rogue wave | marine | Geological |
|  | safety | safety hazard | Safety |
|  | sandstorm | air hazard; weather | Meteorological |
|  | satellite debris | space | Other |
|  | satellite service | utility issue | Infrastructure |
|  | school bus issue | infrastructure issue | Transport |
|  | school closing | infrastructure issue | Infrastructure |
|  | school lockdown | infrastructure issue | Infrastructure |
|  | search | search | Rescue |
|  | security | security | Security |
|  | sewer | utility issue | Infrastructure |
|  | shoreline threat | beach hazard | Safety |
|  | sinkhole | safety hazard | Safety |
|  | sleet | winter weather | Meteorological |
|  | smoke | air hazard | Meteorological; Transport; Health |
|  | snow | winter weather | Meteorological |
|  | snowstorm | weather | Meteorological |
|  | space debris | space | Other |
|  | space weather | space | Other |
|  | squall | weather; marine | Meteorological |
|  | storm | weather; marine | Meteorological |
|  | storm drain | utility issue | Infrastructure |
|  | storm surge | weather; flood | Meteorological |
|  | structure fire | fire | Fire |
|  | swells | marine | Safety; Transport |
|  | telephone | utility issue | Infrastructure |
|  | terrorist incident | criminal activity | Safety |
|  | thin ice | safety | Safety |
|  | thunderstorm | weather | Meteorological |
|  | tornadic waterspout | severe weather | Meteorological |
|  | tornado | severe weather; tornado | Meteorological |
|  | toxic plume | contamination hazard | CBRNE |
|  | toxic spill | contamination hazard | CBRNE |
|  | traffic | road hazard | Transport |
|  | transport issue | transport | Transport |
|  | tropical depression | tropical storm; tropical cyclone | Meteorological |
|  | tropical storm | weather; tropical cyclone | Meteorological |
|  | tsunami | marine | Geological |
|  | typhoon | tropical cyclone | Meteorological |
|  | ultraviolet | safety | Safety |
|  | utility | utility issue | Infrastructure |
|  | vehicle crime | criminal activity | Safety |
|  | volcanic activity | volcano hazard | Geological |
|  | volcanic eruption | volcano hazard | Geological |
|  | volcanic lahar | volcano hazard | Geological |
|  | volcanic lava | volcano hazard | Geological |
|  | waste management | utility issue | Infrastructure |
|  | water | utility issue; water hazard | Geological; Transport |
|  | water main break | utility issue; water hazard | Infrastructure |
|  | waterspout | marine | Meteorological |
|  | weather | weather | Meteorological |
|  | wildfire | fire | Fire |
|  | wind | air hazard | Meteorological |
|  | wind change | air hazard | Meteorological |
|  | wind chill | temperature hazard | Meteorological |
|  | wind shear | air hazard | Meteorological |
|  | winter storm | winter weather | Meteorological |
|  | winter weather | weather | Meteorological |

1. Revision History

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| --- | --- | --- | --- |
| **Revision** | **Date** | **Editor** | **Changes Made** |
| 02 | 09-23-2020 | Scott Robertson | Appendix A Acknowledgments added  Appendix B Event Terms. added  Appendix C Revision History added  First Complete Draft |
| 03 | 10-28-2020 | Rex Brooks | First Complete Edited Draft |
| 04 | 10-01-2021 | Norm Paulsen,  Rex Brooks | Multiple additions  Appendix A Acknowledgments edited  Second Complete Edited Draft |