TECHNICAL REPORT

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Societal security — Emergency management — Message structure for exchange of information

Sécurité sociétale — Gestion des urgences — Message structures pour échanger d'information

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 292, *Security and resilience*.

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Introduction

Clear situation awareness is a key factor for effective emergency response. The building of an operational picture is based on the integration and assessment of information collected from the different teams of responders and other information sources. It relies on exchange of information. The ability to exchange information in a timely and secure manner is critical to the effective conduct of emergency management.

This Technical Report proposes a structured message in order to facilitate these exchanges. The message is flexible with regard to the regulations of nations and organizations. It helps the operational information exchange between organizations, especially when different terminologies or different languages are used as in civil–military cooperation, trans-border collaboration or multi-agency emergencies. It enables all involved organizations to co-operate with a high level of interoperability as described in ISO 22320.

This Technical Report is based on results from the CEN Workshop Agreement CWA 15931 published in March 2009 as the Tactical Situation Object (TSO) by a European Frame Work Program 6 project.

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Societal security — Emergency management — Message structure for exchange of information

1 Scope

This Technical Report describes a message structure for the exchange of information between organizations involved in emergency management. An organization can ingest the received information, based on the message structure, in its own operational picture.

The structured message is called Emergency Management Shared Information (EMSI).

This Technical Report describes the message structure built in order to facilitate interoperability between existing and new information systems.

The intended audience of this Technical Report is control room engineers, information systems designers and decision makers in emergency management.

NOTE The EMSI can be used complementary to other message protocols, as for example the common alert protocol (CAP).

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2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 22300, *Societal security — Terminology*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22300 apply.

NOTE All terms and definitions contained in ISO 22300 are available on the ISO Online Browsing Platform: www.iso.org/obp.

4 The EMSI message

4.1 General

An EMSI describes a part of the operational picture at a particular time. It is exchanged between nodes in order to transfer information and describes events, resources and missions (see Figure 1).

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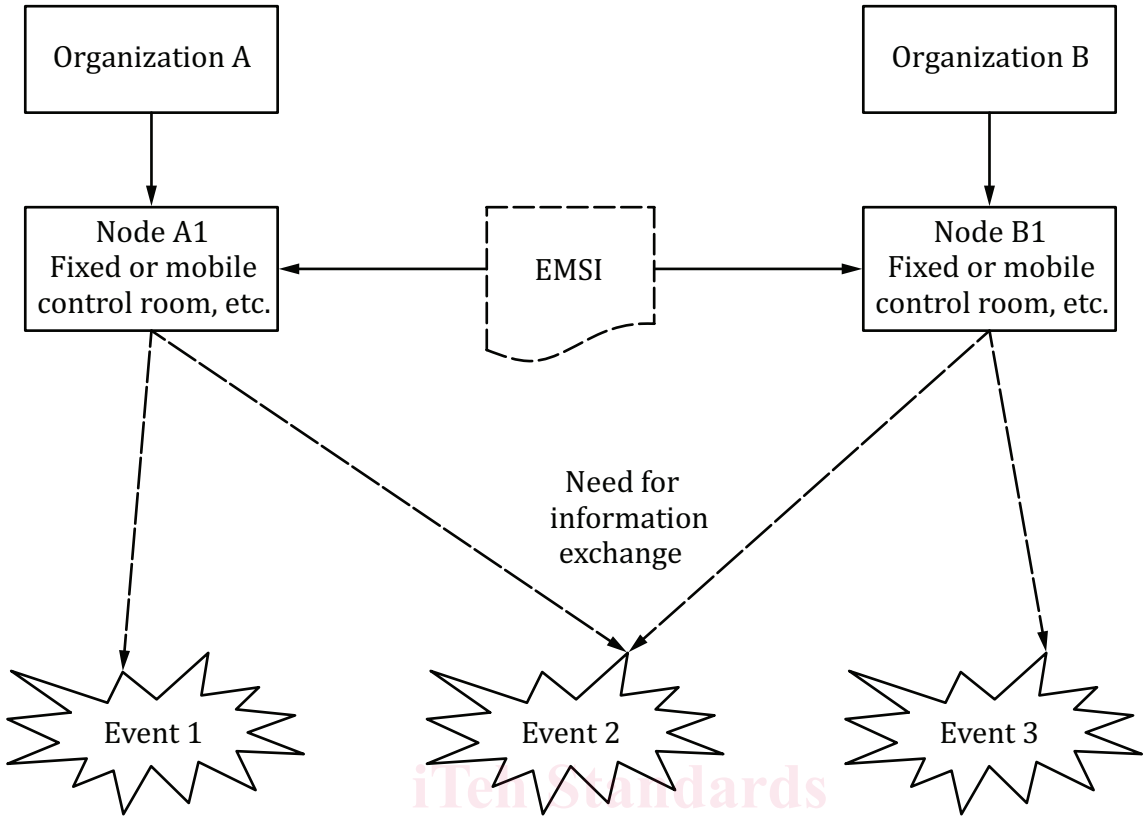

Figure 1 — Exchange of EMSI between organizations

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An EMSI can be used peer-to-peer at the same level of the command hierarchy or up and down the hierarchy. This information contributes to the situational awareness of organizations involved for facilitating coordination of plans and actions.

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Figure 2 describes in an object model the entities which are involved in the EMSI.

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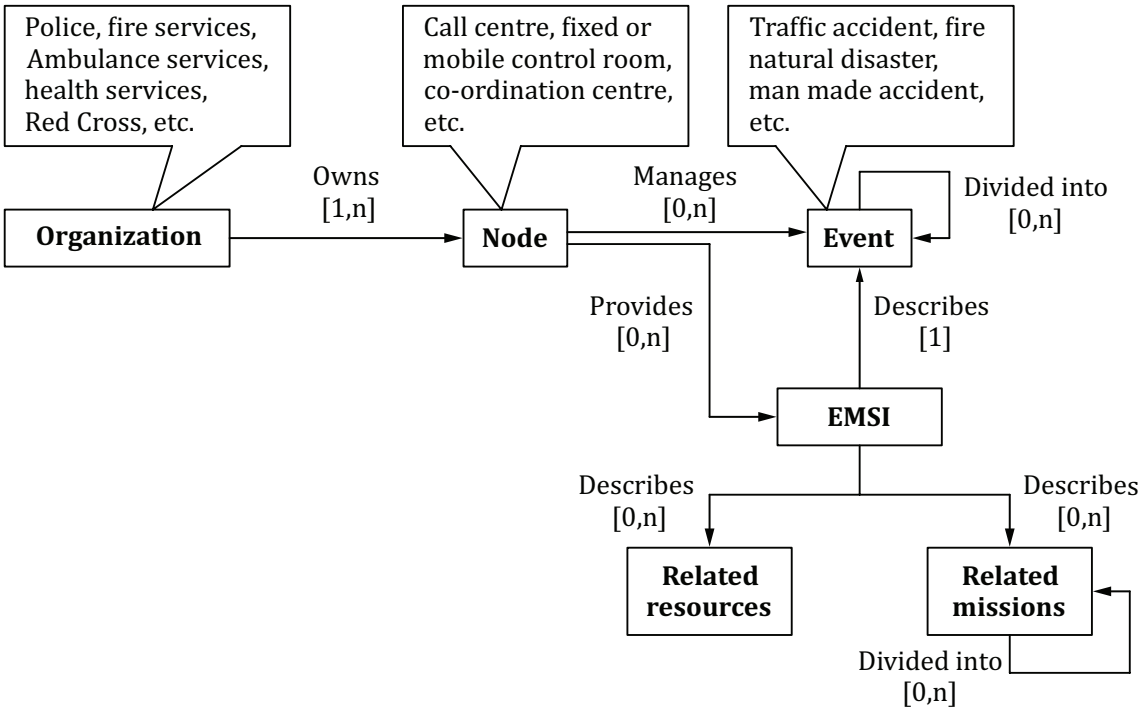

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Key

Cardinality:

[1] The element is mandatory. Only one value can be provided.

[0,1 The element is optional. If it is present, only one value can be provided.

[0..n] The element is optional. If it is present, several values can be provided.

[1..n] The element is mandatory. Several values can be provided.

NOTE Arrows in the diagram represent relationships according to cardinality but not information flows.

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Figure 2 — EMSI described in an object model

An organization owns one or more nodes. A node can manage events.

The message structure is hidden from the user. The applications handling the EMSI present the information to users in their own language, applying their own set of symbols.

The objective of this Technical Report is to agree on the set of information with the following properties:

— useful to share between responders and that represent the situation;

— simple enough in order to enable agreement on use and implementation;

— extensive enough to support the planning and decision making process.

4.2 EMSI content

The Emergency Management Information Sharing contains the following information.

a) Identification of the EMSI:

1) identifier of the individual message;

2) identification of its originator;

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3) time of creation;
4) relation to any other EMSI;
5) organization level, confidentiality and urgency of the information;
6) links to external information;
7) date and time of creation of EMSI.

b) Description of the event:
1) limited assessment of the event;
2) date and time when the event was declared;
3) date and time of the observation;
4) location of the event and associated geographical information;
5) enumeration of the casualties found;
6) prediction of future casualties.

c) Description of the resources:
1) resources each organization has available for the event;
2) resources in use;
3) resource capabilities;
4) resource position.

d) Description of the missions:
1) missions in progress;
2) missions foreseen.

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4.3 EMSI structure

An EMSI is organized in four elements groups.

— CONTEXT: identification of the EMSI;
— EVENT: description of the event;
— RESOURCE: allocated or available resource(s) to/for the event;
— MISSION: description of mission(s).

CONTEXT and EVENT are mandatory while RESOURCE and MISSION are optional.

Figure 3 shows this structure.

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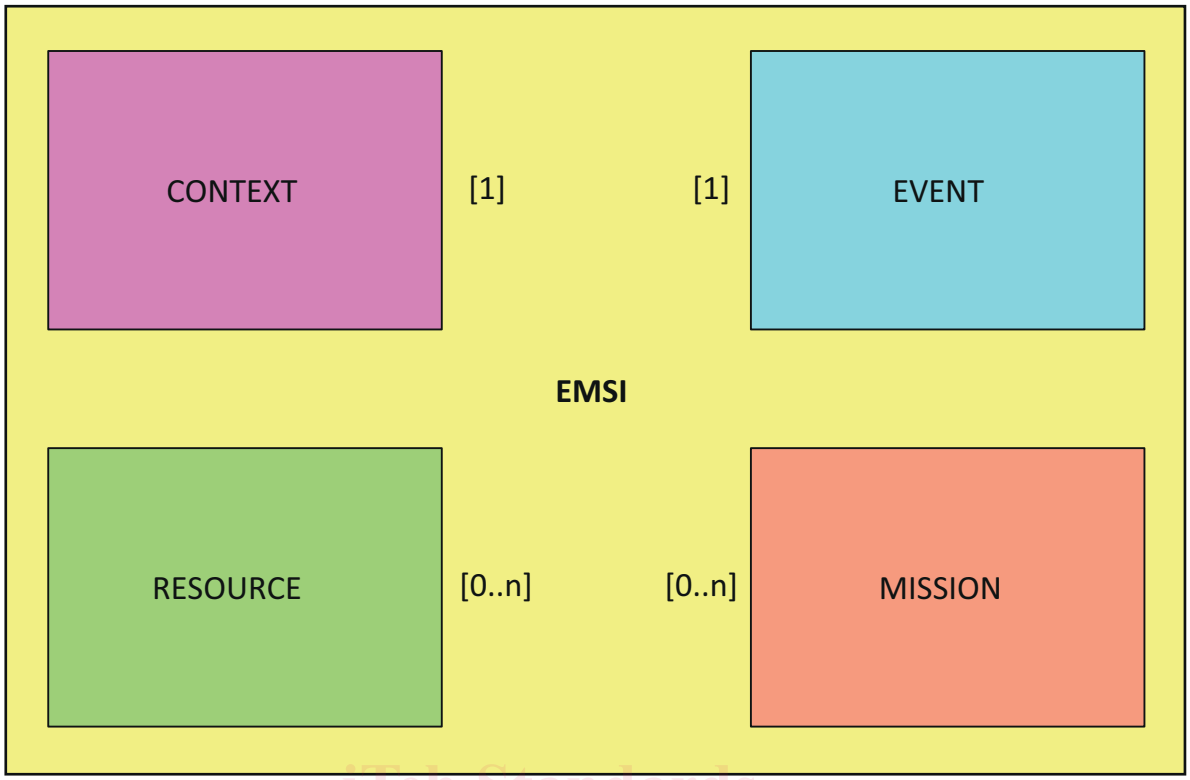

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Key

Cardinality:

[1] The element is mandatory. Only one value can be provided.

[0..n] The element is optional. If it is present, only one value can be provided.

Figure 3 — Content and structure of EMSI

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4.4 General rules for the definition of elements

An element within an EMSI is described by its name, definition, type, cardinality and value domain. An element may be subdivided hierarchically into sub elements which may be subdivided further hierarchically and so on. All sub-elements in the hierarchy are simply called elements.

The following three types of elements can be used in the EMSI structure.

a) Elements which are defined solely by their types: string of characters, integer value, double or float value. These values may be constrained including: limited number of characters for the strings; minimum and maximum values for numerical elements.

   EXAMPLES Identifiers, coordinates (latitude, longitude, height), address.

b) Elements which are defined by their type (always “string of characters”), but constrained to a limited fixed list of valid values.

   EXAMPLES SECLASS, Security classification of the EMSI, string (enumeration),

   CONFID = confidential,

   RESTRC = restricted,

   SECRET = secret,

   TOPSRT = top secret,

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UNCLAS = unclassified,

UNMARK = unmarked.

c) Elements which are defined by their type (always “string of characters”), but constrained to an extensive list of valid values.

EXAMPLE RTYPE CLASS, type of the resource: rescue team, vehicle, tent, water purifier, etc..., string (maximum 80 characters); the complete list of values may be described in a specific part of the data elements and codes specification in the form of a dictionary.

4.5 Rules for the list of elements

The content of the field <Element name> reflects entities in the real world and is worded in English. It should not be longer than 32 characters.

The use of free text in the field <Value domain> should be limited as it cannot be automatically interpreted or translated. A free text field should not exceed 500 characters.

In case that the value domain is an extensive list, the field <Value domain> of the element description refers to a dictionary of codes.

4.6 Implementation of the EMSI

It is recommended to use XML when implementing the EMSI.

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5 The EMSI codes dictionary

5.1 The role of the codes

The use of codes rather than free text gives the possibility to automatically translate information into language appropriate to the user.

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A significant number of elements values are defined by codes representing real world concepts.

5.2 Rules

5.2.1 Code structure

The code for each individual item is expressed as a hierarchical structure subdivided into code elements. The code elements are separated by a slash.

5.2.2 Code elements

Code elements are composed from one up to eight characters taken from the unaccented upper case Latin alphabet (A…Z) and 10 digits (0…9).

5.2.3 Examples

EXAMPLE 1 A fire appliance in a road vehicle with breathing apparatus support.

a) MAT/VEH/ROADVE/FRFGTN/BREATH

MAT: material

/VEH: vehicle

/ROADVE: road vehicle

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/FRFGTN: fire appliance

/BREATH: with breathing apparatus support

EXAMPLE 2 If the observer does not know the category of the vehicle the code generated could be MAT/VEH/ROADVE.

EXAMPLE 3 An EMSI makes sure that the information can be translated to different languages (see Figure 4).

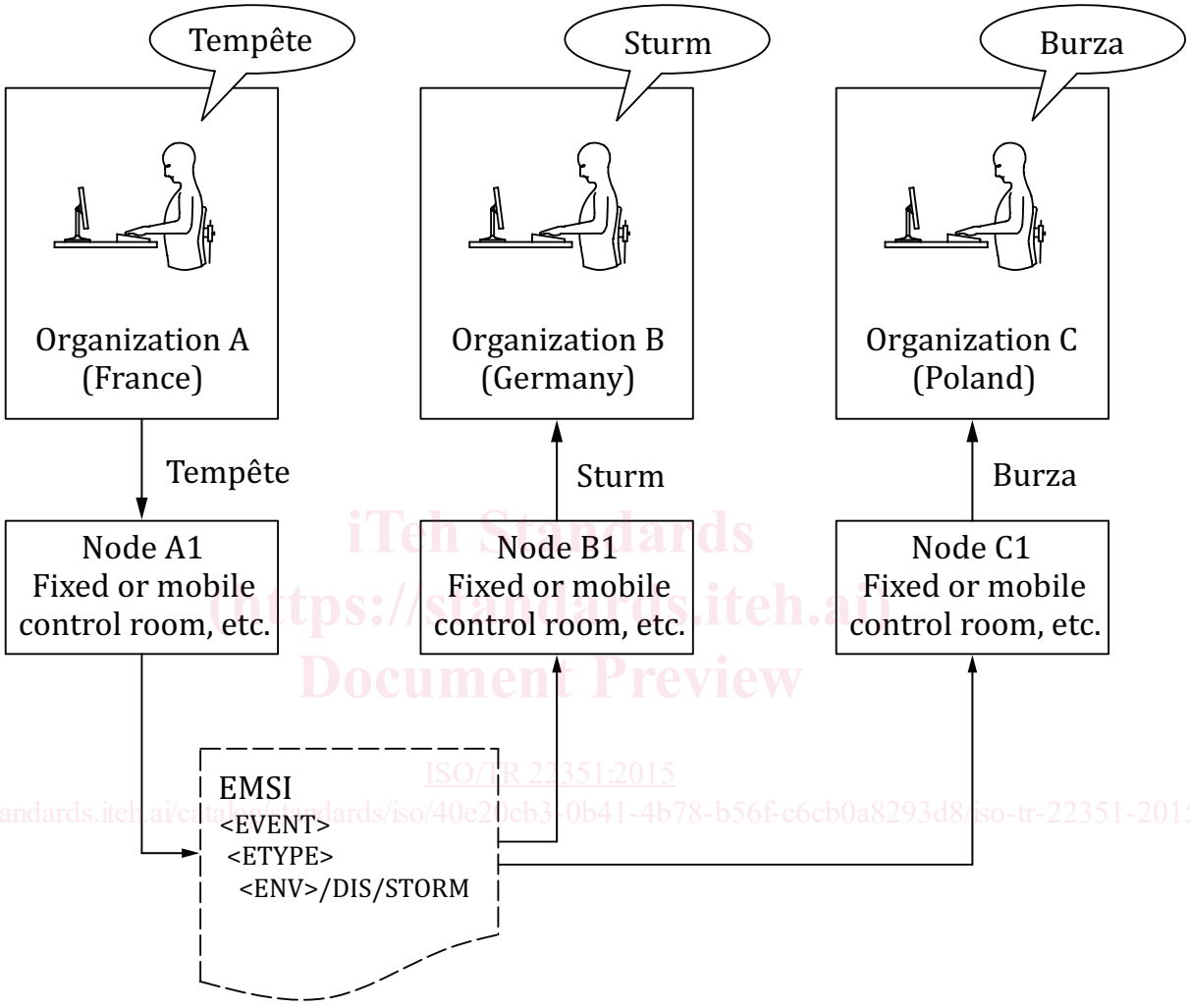

Figure 4 — Code translated automatically to the language of the operator

This example shows how the event of a storm will be encoded in an EMSI message and disseminated to emergency management information systems operators in different countries.

<EVENT>

<ETYPE>

<ENV>/DIS/STORM

will be translated to “tempête» in French, “Sturm» in German and “burza” in Polish on the graphical user interface.

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Annex A
(informative)

Example of EMSI messages

This Annex describes examples of EMSI messages using XML. Users will not, in general, manipulate the messages directly, but through interactive and user-friendly tools based on graphical windows with maps and tables for the creation and the modification of the EMSI elements. This example is based on a scenario involving a collision between a truck and a high speed train in the vicinity of a medium-size city.



Figure A.1 — Example

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NOTE In the different diagrams of this example, the Google Earth® software[1)] has been used for the display of the satellite image and the vector overlays.

Scenario: Witnesses call the 112 emergency number and provide a first assessment of the situation. These pieces of information are entered in the information system of the Call Centre. Then the Call Centre dispatches the alert to the control rooms of two of the organizations which are involved in such incidents: the police and the fire service.

The first EMSI message used for this purpose includes two elements, the CONTEXT and the description of the EVENT:

EMSI message	**additional information**
`<?xml version="1.0" encoding="UTF-8"?>`	
`<EMSI_2_0 xmlns="http://tacticalsituationobject.org/schemas/EMSI/2_0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">`	
`<CONTEXT>`	
`<ID>CC112_200711191724_015</ID>`	Unique EMSI file identifier (for the 112 Call Centre)

1) Google Earth® is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

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