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Semantic layer definition and suitability of OASIS EDXL-CAP and OASIS EDXL-SitRep standards for crisis management in critical infrastructures

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European foreword

This CEN Workshop Agreement (CWA 18028:2023) has been developed in accordance with the CEN-CENELEC Guide 29 "CEN/CENELEC Workshop Agreements – A rapid prototyping to standardization" and with the relevant provisions of CEN/CENELEC Internal Regulations – Part 2. It was approved by a Workshop of representatives of interested parties on 2023-07-09, the constitution of which was supported by CEN following the public call for participation made on 2022-02-15. However, this CEN Workshop Agreement does not necessarily include all relevant stakeholders.

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Introduction

This CEN Workshop Agreement (CWA 18028:2023) has been elaborated as part of the EU-funded research project STRATEGY (https://strategy-project.eu/), which received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement (GA) N° 883520. More specifically, upon investigation of the standardisation universe across its thematic streams of research and prioritisation of the identified gaps against the operational perspective of end-users, STRATEGY underlined the need and supported the drafting of this CWA.

All standardisation items supported by STRATEGY project have been fully tested and validated in tabletop exercises (TTXs) and in one full-scale exercise (FSX).

0.1 Gaps in the definition of electronic messages format exchanged during a crisis

There are some standardised references for defining the structure of the information to be sent during a crisis. The most relevant ones are:

— ISO/TR 22351:2018 Social security – Emergency Management – Message structure for the exchange of information [1] developed by ISO/TC 292 'Security and resilience'; and

— the EDXL family of standards from OASIS [2].

These references define the set of fields to be included in their messages. Their specification states the meaning of each field of the message. This makes straightforward to interpret these messages, but it also has two drawbacks:

a) they do not define a field for each type of information gathered, especially for the information collected from sensors, except for the geographical coordinates; and

b) even if those standardised references defined every type of information to gather, they would become obsolete when more information types were needed.

A possible solution for a) can be complementing those standards with standards for the format of the messages transmitted by the sensors. For the sake of brevity, this document will refer to such standards as 'sensor standards'. An example of such sensor standard is SOS from the OGC [3]. OGC-SOS [3] deals with the problem of reporting any kind of information expressing all information as pairs of field names and field values. But the sensor standards do not define the names for the fields to be reported for crisis management. Therefore, there is currently no standard that defines completely how to express all the information gathered during a crisis. This causes that the incorporation of any new device from a third-party provider, forces to upgrade the systems. This upgrade increases significantly the time for adopting the new sensors and the cost for that, because the responders need to wait for the vendor of their command and control systems to:

— accept to upgrade the system to support the new sensor;

— implement and test the upgrade; and

— release and install the upgrade.

This increases not only costs but also adoption times for the new devices. And this increase can result in unnecessary lives lost if a crisis occurs before the system is upgraded.

Based on the compatibility with the landscape applicable references included in Annex A (informative), this document proposes a semantic layer that consists in a list of names for the concepts to be reported during a crisis to use these names as field names. This way, it will allow reporting any type of information by complementing the mentioned standardized references with sensor standards and it will be possible to create generic components that provide data and software modules that exploit them, potentially providing additional information. In practice, this will enable command and control centres to add new generic sensors that will be automatically recognized by the system without any additional support from the software vendors. The semantic layer in this document will make it possible to add new sensors and software modules without any additional delays for upgrading the system. For technical reasons explained in 4.5, the semantic layer is implemented as a namespace, according to the rules specified by the IETF (Moats, 1997) [4]. The joint use of this namespace with sensor standards is proposed as a feasible way to transmit data from sensors in a way that can be interpreted from generic software during a crisis.

Additionally, the existence of a multitude of different sensor types makes necessary a way to present them in a way that responders can easily understand. It would be impractical trying to provide a software module that presents to the user an information that is specific for each type of sensor, but it is still possible to provide a generic module that interprets the data from sensors looking for alarms and show them to the responders in a generic way. But the provision of this generic presentation of alarms would require a generic interpretation of the data transmitted by the sensors, and this generic interpretation will be possible using the semantic layer. That is, the semantic layer alone does not allow for the generic representation of any types of alarms in the system, but it is a necessary step to achieve it.

0.2 Suitability of OASIS standards and CWA 17358:2028 information exchange guidelines

Though there are already OASIS EDXL standards for defining the rest of the information to send when reporting an alert and for the reports to be generated from the information contained in the system, it is necessary to evaluate the suitability of those standards for covering the full crisis cycle of automatically collecting information about the crisis and automatically producing situational reports from the information collected in the system.

This is especially true in the case of crisis involving critical infrastructures, because their critical nature makes necessary to provide more information on the type of infrastructure affected, their possible damages and the impact of those damages in the crisis.

CWA 17356:2018 [5], provides guidance on aspects of the information exchange requirements between entities in widezone surveillance systems used in critical infrastructures and recommendations on the operational needs and data interoperability (clause 4 and 6.4 respectively). They have been taken into account as requirements to evaluate the feasibility of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] for the automatic processing of information and generation of situational reports during a crisis involving critical infrastructures. For that purpose, this document:

— gathers the operational needs of the users from several types of responders, including fire services, police services and clinical responders;

— considers the responder's feedback on the TTX and FSX carried out within the Horizon 2020 STRATEGY project (G.A. 883520) to evaluate this document;

— identifies the information needed to support those operational needs;

— checks the correspondence of the information included in OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] messages with the information identified; and

— comes to conclusions and suggestions based on the correspondence checking.

The operational needs gathered from the users have taken into account some technologies that did not exist when these OASIS Open standards were released. The conclusions of the analysis will allow responders) and technology developers which operational needs can be implemented with these standards. For the rest of operational needs these conclusions provide alternatives or suggestions for improvements for OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7].

Annex B (informative) and Annex C (informative) provide explanations on how to include the information related with the operational needs in OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] messages, respectively.

The semantic layer in Annex D (normative) and the study of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] suitability analysis (5) and conclusions (5.4) based on the identified operational needs in CWA 17356:2018 [5] tries to cover a standardisation gap on critical infrastructures crisis management information but them both, the semantic layer and the suitability study, could be used also for crisis management in general.

For the purpose of this document, a critical infrastructure is considered to be a facility or network that is necessary for the provision of an essential service.

NOTE The definition of critical infrastructure used in this document is aligned to but more constrained than the definition in the (EU) Directive 2022/2557 [8]: *(4) critical infrastructure: 'an asset, a facility, equipment, a network or a system, or a part of an asset, a facility, equipment, a network or a system, which is necessary for the provision of an essential service'* and essential service is '*a service which is crucial for the maintenance of vital societal functions, economic activities, public health and safety, or the environment*'.

0.3 Use of verbal forms in this document

In this document, the following verbal forms are used:

— "shall" indicates a requirement;

— "should" indicates a recommendation;

— "may" indicates permission;

— "can" indicates a possibility or a capability.

Information marked as "NOTE" is for guidance in understanding or clarifying the associated statements or requirements. 'Notes to entry' used in clause 3 provide additional information that supplements the terminological data and can contain provisions relating to the use of a term.

1 Scope

This document specifies a formal definition of a semantic layer that contains the list of field names to be used in the messages transmitted during a crisis.

Additionally, the document evaluates the suitability of the following standards:

— OASIS EDXL-CAP [6] for automatically collecting part of the information of a crisis involving critical infrastructures; and

— OASIS EDXL-SitRep [7] for the generation of situation reports from the information collected in the system and their automatic delivery to the strategic command.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CWA 17356:2018, *Interoperability of security systems for the surveillance of widezones*

RFC2611 – URN Namespace Definition Mechanisms. The Internet Society. Daigle, L. et al. (1999)

RFC2141 – URN Syntax. IETF. Moats, R. (1997).

3 Terms, definitions, abbreviations and acronyms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 22300 and EN ISO/IEC 80000 series, together with the following, apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp/

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
Application Programming Interface (API)
Specification of a set of services or methods provided by a software component, so it can be invoked by another software component

3.1.2
critical infrastructure
CI (s)
Facility or network that is necessary for the provision of an *essential service* (3.1.3)

Note to the entry: The definition of CIs (3.1.2) used in the document is more constrained that the one included in the EU Directive 2022/2557 of the European Parliament. [8] In the Directive, a CI (3.1.2) is defined as a '*an asset, a facility, equipment, a network or a system, or a part of an asset, a facility, equipment, a network or a system, which is necessary for the provision of an essential service* '. The reason for such limitation is the definition included in the EU Directive 2022/2557 is so broad that makes it impossible in practice to support the evaluation for every possible type of CIs (3.1.2).

3.1.3
essential service
service which is crucial for the maintenance of vital societal functions, economic activities, public health and safety, or the environment

[SOURCE: EU Directive 2022/2557, article 2 (5)]

3.1.4
first responder
individual who is authorized, trained and qualified to provide primary response to victims of a traffic accident, fire or submersion in an emergency, disaster or crisis

Note 1 to entry: Included, but not limited to, fire departments, rescue squads, emergency medical personnel, law enforcement personnel, and in some instances military personnel where the personnel are trained in assessing and treating injuries.

Note 2 to entry: In this document *first responder* (3.14) is only used for 'on scene' response.

[SOURCE: ISO 17840-2:2019(en), 3.1- Modified eliminating 'to victims, traffic accident, fire or submersion' to make more general and adapted including 'emergency, disaster or crisis' and note 2 to entry added]

3.1.5
geographic information system
information system (3.1.8) dealing with information concerning phenomena associated with location relative to the Earth

[SOURCE: ISO 19101-1:2014, 4.1.20]

3.1.6
incident
an event which has the potential to significantly disrupt, or that disrupts, the provision of an *essential service* (3.1.3), including when it affects the national *systems* (3.1.15) that safeguard the rule of law

[SOURCE: EU Directive 2022/2557]

3.1.7
information
knowledge concerning objects, such as facts, events, things, processes, or ideas, including concepts, that within a certain context have a particular meaning

[SOURCE: ISO-IEC 2382:2015, 2121271]

3.1.8
information system
information processing *system* (3.1.15), together with associated organizational resources such as human, technical, and financial resources, that provides and distributes information

[SOURCE: ISO/IEC 2382:2015, 2121292]

3.1.9
interoperability
capability of two or more functional units to process data cooperatively

[SOURCE: ISO-IEC 2382:2015, 2120585-Modified eliminating the application area <distributed data processing> to have a more general definition that applies to this document]

3.1.10
prefix
any sequence of characters that forms the beginning of a *string* (3.1.13)

3.1.11
responder
authorized person who intervenes in an emergency

[SOURCE: ISO/TS 17420-8:2021(en), 3.1.13-Modified including 'authorized']

Note 1 to entry: A *responder* (3.1.11) does not necessarily work directly on the field. For example, a *responder* (3.1.11) could be someone working in a control room or belonging to the strategic level of decisions.

3.1.12
sensor
device or *system* (3.1.15) of devices that detect(s)/sense(s) and responds to one or more physical stimuli

3.1.13
string
data type consisting of a sequence of one or more characters

[SOURCE: ISO 2146:2010, 4.6.9]

3.1.14
string field
Part of a record, message or data structure that contains a *string* (3.1.13)

3.1.15
system
set of interrelated or interacting elements.

[SOURCE: ISO 9000:2015]

3.2 Abbreviations and acronyms

CBRN	Chemical, biological, radiological and nuclear
EN	European standard
EU	European Union
FSX	Full Scale Exercise
HTTP	Hypertext transfer protocol
IEC	International Electrotechnical Commission
IP	Internet Protocol
ISO	International Organization for Standardization
JSON	JavaScript Object Notation
NIMS	National Incident Management System
NSS	Namespace Specific String

OASIS Open	Organization for the Advancement of Structured Information Standards
OGC	Open Geospatial Consortium
SSLy	Strategy Semantic Layer
TCP	Transmission Control Protocol
TTX	Table Top Exercise
URI	Uniform resource identifier
URL	Uniform resource locator
URN	Uniform resource name
XML	Extensible markup language

4 Semantic layer definition

4.1 Gap explanation and extent of the semantic layer definition

Any management of a crisis involves the collection of data and their analysis for appropriate response. In the case of computer-based crisis management systems (3.1.15), this means collecting data from either people or sensors, and storing it in the system (3.1.15) for its further analysis. In practice, data from people are converted to an electronic form, regardless they are only an audio file recording of the voice of the person transmitting a warning or somebody using an application reporting a new incident (3.1.6). In all these cases, data from people-as-sensors ends up being stored electronically. Their input can be considered as another sensor, measuring the input from people, audio, video, or webpage input, etc. Thus, from now on we will consider all the input to the system (3.1.15) as coming from sensors, regardless of whether empirically measured or any input from people.

Some sensors can be connected directly to the computer that will store and analyse the data, in which case there is no need of transmitting them, but in modern sensing systems (3.1.15) this is often not the case. Modern sensing systems (3.1.15) are often autonomous sensors able to perform the sensing of data and even some pre-processing on them before sending the result to the crisis management system (3.1.15).

EXAMPLE 1: A gas sensor takes some air samplings and perform some calculations on the results of the physical measurements to identify the gas and whether it poses a threat or not.

In this case, the sensors need to send the data they have gathered or at least their conclusions to a computer that collects the data for their storage and possibly performs further processing and analysis. After these data are stored, they are available for software modules to access them for several potential reasons.

EXAMPLE 2: A pluviometer sends its measurement to the system (3.1.15), and after that the measurement can be shown in a visual map provided by a Geographic Information System (3.1.5) and analysed by another module that generates an alarm based on the value measured, water accumulation over time and a set of pre-configured thresholds.

The situation is not as simple as the sensor sending the data to that computer, because even for the same observed phenomenon to be measured, there can be several sensors able to measure it. And, as in the example, there may be several software modules making use of that set of data. For the system (3.1.15) to work, it is necessary that all sensors send the data in a way that the computer collecting the data can understand, and that it stores the data in a way that all software modules that implement the semantic layer can exploit the data, too.

The solution to this problem is that both the sensors and the computer that is receiving their data, and the terms used to express those data comply with a set of protocols for data transmission. This set of protocols for data transmissions will need to allow not only that the data are sent by the source and received by the recipient, but also that it is done in such a way that can be interpreted later.

The transmission of electronic messages so that they arrive to their destination is currently organized as a stack of different abstract layers, each of them responsible for carrying out one part of the process and supported by one or more standards or specifications. For instance, the transmission stack of protocols for a message compliant with OASIS EDXL-CAP [6] could be:

— IP for addressing the peers of the transmission.

— TCP for handling the connection and the tracking of the different packages sent.

— HTTP for handling the text.

— OASIS EDXL-CAP [6] for specifying the content of the message.

The standards that already exist for defining the format of the information that can be used during a crisis can be considered to belong to one of two categories:

— API (3.1.1) oriented standards, which defines specific fields for each information item to be transmitted.

— Name-value oriented standards, which sends the information including the name of the field to report and its value.

There already exists some protocols for defining the format of the information to be transmitted during a crisis, such as ISO/TR 22351 [1]and OASIS EDXL-CAP [6], but they are API (3.1.1) standards that do not define all possible information to be sent. Some other standards for the definition of the format of the data to be transmitted by sensors, such as OGC-SOS [3], are name-value oriented standards, but they do not define the names of the information they transmit.

A study of the existing standards applicable on crisis management is presented in A.2 in Annex A (informative).

Therefore, though there are already several standardised references that define how to send part of the information during a crisis, and their meaning is covered by them, there is no pre-established list of meanings for the fields sent by the sensors.

The following Figure 1 shows the transmission steps and the gap (in yellow) in data transmission interoperability (3.1.9) during a crisis covered by this document.

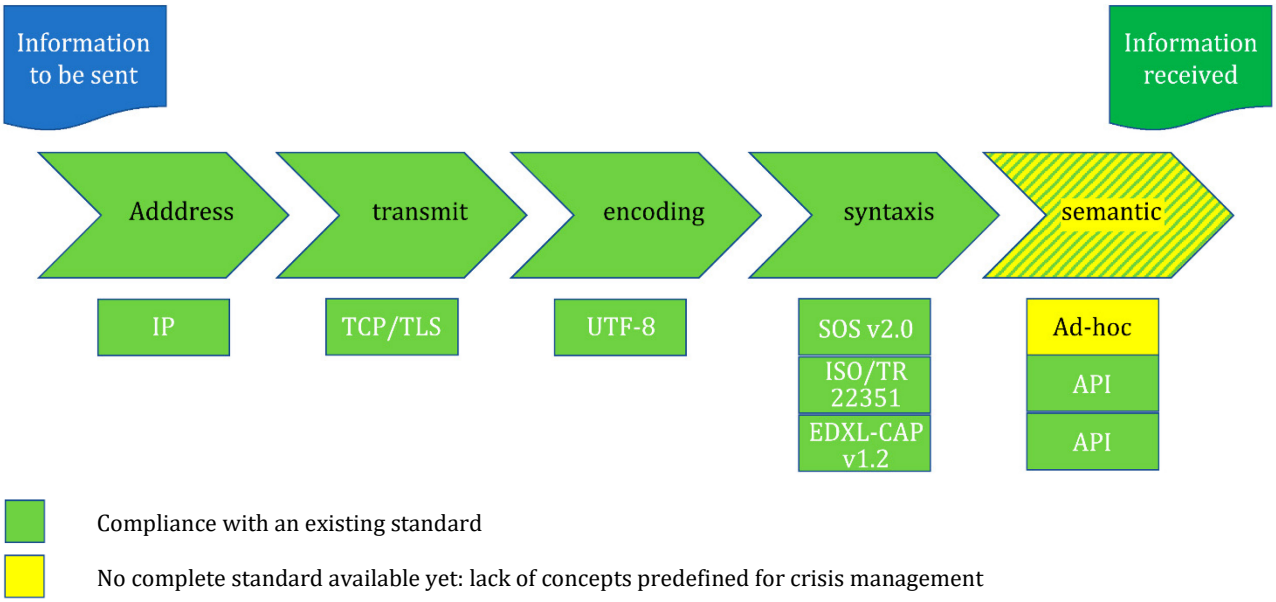

Figure1 — Lack of semantic layer results in incomplete data interoperability

In practice, this lack means that it is impossible to build generic sensors whose input can be exploited directly by a generic software module. Every time that a new sensor is added to the system (3.1.15), the software modules that need to exploit their data must be adapted to look for the specific fields that the new sensor provides. And there is no guarantee that the provider of the software module will be willing to do so, or spend the time it will take, or even ensure that the adaptation will work with no errors. And this will incur additional costs, too.

In contrast, the semantic layer specified in this document is designed to allow the sensors and software modules that comply with it to add new sensors and even new software modules as soon as they are created without the need for waiting for the rest of the system (3.1.15) to be adapted, because it makes possible for the new sensors and new software modules to be tested against any testing platform compliant with the semantic layer before connecting to the real production system (3.1.15).

The semantic layer for the data provided by sensors is defined in 4.4 to 4.6 and includes:

— a set of possible meanings for the data subject to be provided by the sensors;

— a formal electronic representation for them, and

— a way to check the correctness of the meanings transmitted by sensors compliant with that layer.

As there are already some API (3.1.1) oriented standards for the provision of a limited set of data during a crisis, the meanings corresponding to those data are deliberately set out of the scope of the semantic layer. However, there are some limitations to this constraint:

— This document focuses on gaps concerning crisis management in and affects the development of command and control centres for managing crisis and also any environment that sends data from sensors. The semantic layer is designed to support any type of sensor data, because limiting the concepts included could probably cause misalignment with future sensors standards. In practice, this means that though the semantic layer does not include any field for specifying the data in the existing standards for crisis management (see 4.3), it includes the concepts for generic data input that are currently covered by those standards.

EXAMPLE: ISO/TR 22351:2015 [1] already includes a field for the quantity of a resource. For this reason, the semantic layer does not include a term for specifying the meaning for the field corresponding to that quantity, but it includes a term for specifying the meaning for the field corresponding to a generic quantity, to be used for quantities not associated to a resource.

— Even sensor standards for the definition of the format of the messages transmitted normally include some fields defined in their specification, with date, time and geographic information about coordinates. For that reason, they are not included in the semantic layer, either.

4.2 Methodology to define the semantic layer

The specification of the semantic layer is made according to the following steps:

a) Preparation of a list of subject matters that shall not be included in the semantic layer: some subject matters are already covered by some other standard (see A.3, Annex A (informative)).

b) Production of a list of concepts to be included in the definition: before preparing the formal definition, it is necessary to identify which concepts will be included in the semantic layer.

c) Definition of the format of the semantic layer, including the organization of the concepts, the standards to be supported (see 4.3), and the syntax of the definition.

d) Formal definition of the semantic layer, applying the syntax specified in b) to the list of concepts specified in step a).

4.3 Standards to be supported by the definition of the semantic layer

The semantic layer is conveniently defined considering the exclusion of concepts and information already provided in the following relevant standards in order to support them.

NOTE 'Support' does not necessarily means adopting or recommending the adoption of these standards, but it can also consist in following the recommendations or the philosophy of such standards for adding new information or functionalities.

The standards considered for this purpose are:

— OGC-SOS v2.0 [3], a standard that defines the format of data transmitted from geographically referenced sensors.

— OASIS EDXL-CAP v1.2 [6], is a protocol for sending alerts during a crisis-emergency.

— OASIS EDXL-DE v1.0 [9], is the envelope or "wrapper" of the OASIS EDXL-CAP [6] Alert (Payload) or any of the other EDXL messages.

— OASIS EDXL-SitRep v1.0 [7], describes a set of standard reports and elements that can be used for data sharing among emergency information systems (3.1.8), and that provide incident (3.1.6) information for situation awareness.

— OASIS EDXL-HAVE v2.0 / HL7 v2 [10], which is mirrored by HL7, defines a way to collect data on the resource availability of medical facilities in the area of the emergency and adjacent communities.

— OASIS EDXL-TEP v1.1 [11] allows first responders (3.1.4) to route the most critical, or the highest triage assessed emergency patients to the best match for the patient's injuries or illness.

— OASIS EDXL-RM v1.0 [12] is a definition of a set of messages for handling all types of messages for logistics and commands.

This document considers the following recommendations in terms of support and alignment with these standards:

— Non-collision: the semantic layer should avoid proposing anything that requires changing anything in the considered standard, except for adding new content, and only if the newly added content is compatible with the previous content of the standard without needing to change it. For this reason, the sematic layer should not allow including concepts already covered by the mentioned standard, or if it did, clarify that they should not be used for the context expressed in that considered standard.

— Compatible with previous philosophy of the considered standards: the semantic layer should try to be compatible with the philosophy implied in the considered standards. For instance, if a considered standard has an implicit design that differentiates between information included in the API (3.1.1) and information to be declared in another standard, then the terms of the semantic layer should be treated as part of that different standard's information.

— Compliance with previous suggestions. If the considered standard already have suggestions on how to define the names of the fields to be transmitted, then the semantic layer should consider compatibility with them.

The informative Annex A provides the landscape study of these existing standards that define the meaning of the information to be transmitted during a crisis and how to maintain compatibility with them according to the expressed criteria.

4.4 List of concepts to be included in the semantic layer definition

4.4.1 General

It is not feasible to define each possible field from every possible sensor to be included in the semantic layer. Instead, the concepts in the semantic layer are constructed around the different quantities associated to measurement units defined in EN ISO/IEC 80000 series [13]. The list is completed with some already known concepts of special relevance that are not covered by those quantities.

EN ISO/IEC 80000 series [13] defines several series of measurement units and the concepts that apply to the physical aspects to be measured. Those documents define only numeric concepts, and for that reason they refer to them as 'quantity'. But the semantic layer is not limited only to numeric concepts, which is why it uses the more generic term 'concept'. This document uses many of the quantities defined in the documents of the EN ISO/IEC 80000 series [13] to identify the names corresponding to the concepts to be included in the semantic layer. This correspondence is designed to be univocal so they can be easily referred in a software code. For this reason, redundant names are merged in a univocal form when producing the formal definition.

The document does not include any concept for time and date because practically all standards for sensors already include fields for the time and date of the measurement. However, the standards for space and time include the term 'duration' instead.

These lists in 4.4.2 to 4.4.17 are constructed around the concepts instead of the terms chosen to refer to them. When two terms correspond to the same concept, only one of them is kept to avoid redundancy. However, the semantic layer includes the redundant terms as synonyms, as explained in 4.5.2.

The list of concepts does not include any constant, even those included in the EN ISO/IEC 80000 series [13], because a constant is conceptually something that does not change, and therefore there is no point in measuring it. As there is no need to report it, then there is no need to measure it, either. And as there is no need to measure it, there is no need to define a name for it, either. As EN ISO 80000-2:20019 [13] contains only mathematical signs and symbols, without any concept, the semantic layer does not contain any concept from it.

The EN ISO/IEC 80000 series [13] are used in this document for getting a complete list of concepts that correspond to physical realities corresponding to ordinal values in those standards. The semantic layer is designed to be backward compatible in time. That is, if new concepts would appear in the future, the semantic layer could be revised to incorporate them, but the names already included should never be removed to ensure that it is still possible to use it to interpret the data provided by old software and sensors that are compliant with older versions of it. EN ISO/IEC 80000 series [13] are periodically reviewed and some quantities could be removed or renamed and that would make impossible for the semantic layer to remain backward compatible if all its names would be reviewed accordingly to comply with the new versions of the EN ISO/IEC 80000 series [13]. For that reason, the semantic layer is designed to be adaptable in the future to the changes in the EN ISO/IEC 80000 series [13] with its synonyms mechanism (see 4.5.2). The semantic layer includes the concepts based on the terms in those standards in the moment of writing this document, but it is designed so these names should never change in the future due to revisions of the EN ISO/IEC 80000 series [13]. Instead, if one of those standards change, the criteria for upgrading the semantic concepts should be:

— New concepts proposed in the EN ISO/IEC 80000 series [13] should be added to the semantic layer according to the syntax in 4.5.2.

— Concepts removed from an EN ISO/IEC 80000 series [13] or marked as deprecated revised standard should include the infix “(Deprecated)” so it is easy for developers of new sensors to identify they should consider using an alternative name.

— Concepts whose name is changed in an EN ISO/IEC 80000 standard should not change their associated name in the semantic layer. Instead, the new name proposed in the revised standard should be added to the list of synonyms for that concept in the semantic layer, and the explanation should start with the prefix (3.1.10) “(deprecated)”.

— Synonyms are not removed from the semantic layer even if their corresponding term is removed from an EN ISO/IEC 80000 standard, to make sure that existing software that makes use of them continue working.

This way the semantic layer is designed to keep backwards compatibility even as the EN ISO/IEC 80000 series [13] changes.

4.4.2 General concepts in EN-ISO/IEC 80000

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-1:2022 [14], with the exception of the following ones included in 4.4.6:

— Electric potential difference.

— Electric resistance electromagnetism.

— Electric conductance.

— Inductance.

NOTE These concepts already have their corresponding equivalent in the specific sections, they refer to specific terms, and for that reason they are considered in 4.4.2.

The following concepts are also considered in this general concepts’ list and are not included in the specific information where they have equivalent terms.

— Force (not included in 4.4.4).

— Pressure (not included in 4.4.4), with stress as a synonym.

— Power (not included in 4.4.4).

— Energy (not included in 4.4.5).

— Celsius temperature (not included in 4.4.5).

— Electric charge (not included in 4.4.6).

— Magnetic flux (not included in 4.4.6).

— Magnetic flux density (not included in 4.4.6).

— Capacitance (not included in 4.4.6).

— Luminous flux (not included in 4.4.7).

— Illuminance (not included in 4.4.7).

4.4.3 Space and time

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-3:2020 [15], with the exception of the following ones:

— Height, depth, altitude is included as 'Height'.

— Path length, with Arc Length as a synonym.

— Rotation Frequency instead of the term frequency, to avoid it colliding with the general term, whose meaning is similar but not necessarily applied to rotations.

The concept 'thickness' shall not be included because it is the same as 'width', which is included.

4.4.4 Mechanics

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-4:2019 [16], with the exception of the following ones:

— Relative density, with relative mass density as a synonym.

— Static friction, with relative static friction force as a synonym.

— Modulus of elasticity, with young modulus as a synonym.

— Modulus of compression, bulk modulus, with bulk modulus as a synonym.

— Static friction coefficient, with static friction factors and coefficient of static friction as synonyms.

— Kinetic friction factor, with dynamic friction factor as a synonym.

— Drag coefficient, drag factor: This term also appears in the section of characteristic numbers, and for the same concept. As it is necessary to differentiate them, the semantic layer includes the term drag factor, which only appears here.

— Viscosity, with Dynamic Viscosity as a synonym.

— Volume flow rate, with 'wind speed' as synonym in the context of meteorology.

4.4.5 Thermodynamics

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-5:2019 [17], with the exception of the following ones:

— Temperature (Thermodynamic temperature) with Thermodynamic temperature as a synonym.

— Heat, amount of heat with amount of heat as a synonym.

— Thermal insulance, coefficient of thermal insulance, thermal resistance in building technology with coefficient of thermal insulance and thermal resistance in building technology as synonyms.

— Thermal conductance, with transfer coefficient as a synonym.

— Isentropic exponent, with isentropic expansion factor as a synonym.

— Internal Energy, with thermodynamic energy as a synonym.

— Helmboltz energy, with Hemboltz function as a synonym.

— Gibbs energy, with Gibbs function as a synonym.

— Specific internal energy, with specific thermodynamic energy as a synonym.

— Specific Helmholtz energy, specific Helmholtz function as a synonym.

— Mass concentration of water vapour, with absolute humidity as synonym.

4.4.6 Electromagnetism

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN 80000-6:2008 [18] and updated with the contents of EN IEC 80000-6:2022 [19], according to the criteria in 4.4, with the exception of the following ones:

— The constants included among the quantities in the document are deliberately skipped because there is no point in a sensor reporting a constant.

— Electric charge density, with volumetric electric charge as a synonym.

— Voltage, with electric tension as a synonym.

— Linked flux, with protoflux as a synonym, and make its description start with the prefix (3.1.10) ‘(deprecated)’.

— Coercivity, with coercive field strength as a synonym.

— Scalar magnetic potential, with Magnetic potential as a synonym.

— Magnetic moment, with magnetic area moment as a synonym.

— Magnetic field strength, with magnetizing field as a synonym.

— Electromagnetic-energy density, with volumic electro-magnetic energy as a synonym.

— Source voltage, source tension source tension as a synonym.

— Voltage phasor, with electric tension phasor as a synonym.

— Resistance, with resistance to alternating current as a synonym.

— Inductance, with self inductance as a synonym.

— Instantaneous power, also referred simply as power, but as it is conflicting with the term power from mechanics, the semantic layer shall include only instantaneous power in this context.

— Loss factor, with dissipation factor as a synonym.

— Apparent impedance, with modulus of impedance as a synonym.

— Impedance, with complex impedance as a synonym.

— The description of the concept Magnetic flux density includes the infix '(Deprecated)'.

— The description of the concept Magnetic flux starts with the prefix (3.1.10) '(Deprecated)'; and

— The description of the concept Magnetic field strength includes the infix '(Deprecated)'.

4.4.7 Light

The definition of the semantic layer includes all the concepts that are expressed as quantities in ISO 80000-7:2019 [20], with the exception of the following ones:

— Electromagnetic Radiant energy electromagnetism: The term in the standard was only 'radiant Energy' but applied only to the field of Electromagnetism. The reason for naming it this way is to avoid the collision with the term radiant energy for ionic radiation.

— Spectral radiant flux, with spectral radiant power as a synonym.

— Luminous exposure, with illumination and light exposure as synonyms.

— Photon number, number of photons, with number of photons as a synonym.

— Transmittance optical density, with optical transmittance density, and decadic absorbance density as synonyms.

— Linear attenuation coefficient, with linear extinction coefficient as a synonym.

4.4.8 Acoustics

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-8:2020 [21].

4.4.9 Physical chemistry and molecular physics

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-9:2019 [22], with the exception of the following ones:

— Amount of substance, with number of moles as a synonym.

— Latent heat of phase transition, with enthalpy of phase transition as a synonym.

— Osmotic factor of solvent, osmotic coefficient of solvent as a synonym.

— Standard equilibrium constant, with thermodynamic equilibrium constant as a synonym.

— Equilibrium constant <pressure basis> is included in the semantic layer as Equilibrium constant pressure bases.

— Equilibrium constant <concentration basis> is included in the semantic layer as Equilibrium constant concentration basis.

— Grand-canonical partition function, with grand partition function as a synonym.

— Degeneracy, with multiplicity as a synonym.

— Degree of dissociation, with dissociation fraction as a synonym.

— Transport number of the ion B, with current fraction of the ion B as a synonym.

4.4.10 Atomic and nuclear physics

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-10:2019 [23], with the exception of the following ones:

— Atomic number, with proton number as a synonym.

— Nucleon number, with mass number as a synonym.

— Charge number, with ionization number as synonym.

— Gyromagnetic ratio, with magnetogyric ratio gyromagnetic coefficient as a synonym.

— Gyromagnetic ratio of the electron, with magnetogyric ratio of the electron and gyromagnetic coefficient of the electron as synonyms.

— Landé factor, with g factor of atom as a synonym.

— Gyroradius, with Larmor radius as synonym.

— Decay constant, with disintegration as synonym.

— Mean duration of life, with mean life time as synonym.

— Specific activity, with massic activity as synonym.

— Activity density, with volumic activity and activity concentration as synonyms.

— Volumic cross section, with macroscopic cross section as synonym.

— Volumic total cross section, with macroscopic total cross section as synonym.

— Ionic radiant energy: Actually, the original term in the standard was only ‘radiant energy’ for ionic radiation, but the term ‘ionic’ is included instead to avoid the collision with the term of the Subject Matter Light.

— Total linear stopping power, with linear stopping power as synonym.

— Total mass stopping power, with mass stopping power as synonym.

— Ion numbed density, ion density as synonym.

— Diffusion coefficient, with diffusion coefficient for particle number density as synonym.

— Quality factor <ionizing radiation> is included as Quality factor ionizing radiation.

4.4.11 Characteristic numbers

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-11:2020 [24], with the exception of the following ones:

— Strouhal number, with as Thomson number synonym.

— Bingham number, with plasticity number as synonym.

— Rossby number, with Klebel number as synonym.

— Darcy friction factor, with Moody friction faction as synonym.

— Goertler number, with Goertler parameter as synonym.

— Stokes number <time related> is included in the semantic layer as Stokes number time related.

— Stokes number <vibrating particles> is included in the semantic layer as Stokes number vibrating particle.

— Stokes number <rotameter> is included in the semantic layer as Stokes number rotameter, with power coefficient rotameter as synonym.

— Stokes number <gravity> is included in the semantic layer as Stokes number gravity.

— Stokes number <drag> is included in the semantic layer as Stokes number drag.

— Laplace number, with Suratman number as synonym.

— Taylor number <momentum transfer> is included in the semantic layer as Taylor number momentum transfer.

— J-factor, with heat transfer factor and Colburn number as synonyms.

— Bejan number <heat transfer> is included in the semantic layer as Bejan number heat transfer.

— Bejan number <entropy> is included in the semantic layer as Bejan number entropy.

— Eckert number, with Dulong number as synonym.

4.4.12 Condensed matter physics

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN ISO 80000-12:2019 [25], with the exception of the following ones:

— Angular wavenumber, angular repetency is included in the semantic layer as Angular wavenumber, with angular repetency as synonym.

— Fermi angular wavenumber, Fermi angular repetency is included in the semantic layer as, with Fermi angular repetency as synonym.

— Debye angular wavenumber, Debye angular repetency is included in the semantic layer as Debye angular wavenumber Debye angular repetency, with as synonym.

— Richardson constant. Note: This is not a constant. It depends on the thermodynamic temperature and work function.

4.4.13 Information science and technology

The definition of the semantic layer includes all the concepts that are expressed as quantities in EN 80000-13:2008 [26], with the exception of the following ones:

— Traffic load, with traffic carried intensity as a synonym.

— Call intensity, with calling rate as a synonym.

— Storage capacity, with storage size as a synonym.

— Bit rate, with binary digit rate as a synonym.

— Bit period, with bit period of binary digits as a synonym.

— Equivalent binary digit rate, with equivalent bit rate as a synonym.

— Modulation rate, line digit rate as a synonym.

— Clock frequency with clock rate as a synonym.

— Information entropy, as opposed to original term entropy, because it collides with term entropy of thermodynamics.

— Conditional entropy, with mean conditional information content and average conditional as synonyms.

— Channel capacity per character, with channel capacity as a synonym.

— Channel time capacity, with channel capacity as a synonym.

4.4.14 Monitoring

The following concepts related with the monitoring of devices are included in the semantic layer:

— Operational status: the status of a device that is being monitored (not to be confused with the status of the sensor that is monitoring the device):

  — Status_not_started: the device has not been started yet.

  — Status_stopped: the device is stopped.

  — Status_active: the device is started and working properly.

  — Status_disrupted: the device is not working due to an external undesired condition.

  — Status_disabled: the device is stopped and compelled to not start till it is enabled again.

  — Status_enabled: the device is allowed to try to start when it receives an order to do so.

  - Status_malfunctioning: the device is working, but it is not able to comply with its operational specifications.

NOTE This does not necessarily mean that the measurements are unreliable.

- Device work status: states whether the device is working or not, and whether it is working according to its operational specifications:
  - Device status able to work: the device is able to work according to its operational specifications.
  - Device status malfunctioning: the device is working, but it is not able to comply with its operational specifications. This does not necessarily mean that the measurements are unreliable.
  - Device status unable to work: the device cannot work at all.
- Cause: reason why a device is not working properly or for an incidence.
- Trust status: Status of trust of the device. It is not the status of trust of a given measurement or reported value, or the trust status of a report or an alert. Suggested values are:
  - Trust status pending approval: The system received a request for adding this sensor and its approval is still pending.
  - Trust status approved: the sensor is approved and currently trusted.
  - Trust status untrusted: the system (3.1.15) received a request for adding this sensor but now it is not trusted yet, regardless the request was originally rejected or due to have passed through a state of compromised.
  - Trust status unreliable: the measurements provided by the device are no longer considered to be reliable. This may not necessarily be due to the device having been compromised.
  - Trust status compromised: the sensor is believed to have been compromised by an external party. the fact that a sensor has been compromised does not necessarily mean that it must be automatically put in the state of not trusted.
- Alarm: Intelligent sensors may use this field to indicate whether a measurement from a sensor is expected to trigger an alarm or not.
- Origin data type: States whether the data is actual, predicted or simulated:
  - Origin_type_actual: value for origin_type corresponding to actual data.
  - Origin_type_predicted: value for origin_type corresponding to predicted data.
  - Origin_type_simulated: value for origin_type corresponding to simulated data.
- Warning threshold: indicates the value to decide whether to trigger a warning for somebody to evaluate the actions to be taken.
- Alarm threshold: indicates the value to decide whether to trigger an alarm to implement actions to deal immediately with the situation.

4.4.15 Facilities

The following concepts related with the facilities and their status and are included in the semantic layer:

- Facility type: Type of facility
  - Facility type Hotel: Value for type of facility hotel.
  - Facility type Hospital: Value for type of facility Hospital.
  - Facility type Shelter: Value for type of facility Shelter.
  - Facility type Clinic: Value for type of facility Clinic.
  - Facility type Theatre: Value for type of facility Theater.
  - Facility type Stadium: Value for type of facility Stadium.
  - Facility type Warehouse: Value for type of facility Warehouse.
  - Facility type Police Station: Value for type of facility police station.
  - Facility type Firefighter Station: Value for type of facility Firefighter Station.
  - Facility type Military quarters: Value for type of facility military quarters.
  - Facility type Electric Power plant: Value for type of facility Electric Power plant. It includes the following subtypes:
    - Facility type Electric Power Plant/Wind Turbine: Value for specific subtype of electric power plant wind turbine.
    - Facility type Electric Power Plant/Photovoltaic: Value for specific subtype of Electric Power Plant photovoltaic plant.
    - Facility type Electric Power Plant / Gas Plant: Value for specific subtype of Electric Power Plant gas plant.
    - Facility type Electric Power Plant / Fuel Plant: Value for specific subtype of Electric Power Plant fuel plant.
  - Facility type Oil Refinery: Value for type of facility oil refinery.
  - Facility type Oil Store: Value for type of facility oil store.
  - Facility type Transmissions tower: Value for type of facility transmissions tower.
  - Facility type Electricity transport line: Value for type of facility electricity transport line.
  - Facility type Oil Pipeline: Value for type of facility oil pipeline.
  - Facility type Gas Pipeline: Value for type of facility gas pipeline.
  - Facility type Inland waterways: Value for type of facility inland waterways.
  - Facility type Water processing plant: Value for type of facility water processing plant.

- Facility type Desalination plant: Value for type of facility desalination plant.
- Facility type Dam: Value for type of facility dam.
- Facility type Care home: Value for type of facility care home.
- Facility type School: Value for type of facility school.
- Facility type Prison: Value for type of facility prison.
- Facility type Young Offenders Institute: Value for type of young facility offenders' institute.
- Facility type Orphanage: Value for type of facility orphanage.
- Facility type Road: Value for type of facility road. It includes the following subtypes:
- Facility type Road / Highway: Value for specific subtype of road highway.Facility type Train Station: Value for type of facility train station.
- Facility type Airport: Value for type of facility airport.
- Facility type bridge: Value for type of facility bridge

- Total Capacity: total capacity of the facility indicated in the units given by the field units.
- Current availability: indicates the current number of available resources in the units given by the field units.
- Total Capacity Units: the units that the capacity is expressed in.
- Number of Building Occupants: number of people present in the facility.
- Operational status of the capacity with the following values:
  - Operational Status Decommissioned: Value for operational status of capacities that indicate that the capacity was decommissioned and has not been maintained but it could potentially work again if proper staff and maintenance was provided.
  - Operational Status Idle: Value for operational status of capacities that indicates that the capacity is ready to work but currently idle.
  - Operational Status non-operational: Value for operational status of capacities that indicates that the facility has not been decommissioned but is currently not able to operate.
  - Operational Status Partially Operational: Value for operational status of capacities that indicates that the facility is currently operating but cannot perform at its maximum capacity.
  - Operational Status Fully Operational: Value for operational status of capacities that indicates that the facility is currently operating and can perform at its maximum capacity.
  - Operational Status Fully functional: Value for operational status of capacities that indicates that the capacity is currently under operation and is fully functional.

— Can cause when working: List of threats that can be caused by the facility if it is compromised when it is working. Values to be taken from OASIS EDXL-CAP [6] list of types of emergencies.

— Can cause when idle: List of threats that can be caused by the facility if it is compromised. Values to be taken from OASIS EDXL-CAP [6] list of types of emergencies.

— Possible threat causes: List of threats that can compromise the facility and cause any of the threats stated in the “Can cause” lists.

— Invaluable assets: list of invaluable assets, such as historic artworks that are considered worth to be protected.

— Cultural importance: Description of the importance of the facility or its contents.

— Use: Current use of the Facility.

Note: the current use of the facility may not necessarily coincide with the one implicit in its type.

EXAMPLE: A stadium might be assigned temporarily as a shelter for victims.

— Construction Year: The year that the facility was constructed.

— Accuracy of year of construction: can be either ‘Exact’ or ‘Approximate’.

— Last Renovation Year: The last year of structural renovation of the facility.

— Construction material: A list of materials used in the construction of the facility, each of them may be:

  — Construction Material Reinforced concrete.

  — Construction Material Masonry.

  — Construction Material Steel.

  — Construction Material Timber.

  — Construction Material Pre-cast concrete.

  — Construction Material Other.

— Number of floors above ground: number of floors of the facility above ground.

— Number of basements: number of basements of the facility above ground.

— Sensitivity issues: List of sensitivity issues that might be associated with the facility.

— Disable access means: List of access means to ease access to the facility for the disabled people, such as ramps or adapted elevators, or none to indicate that no special mean is provided.

4.4.16 Damage assessment

The following concepts related with the damage assessment (related to building only) are included in the semantic layer:

— Building code: a unique identifier for the building.

— Damage_Cause: Cause of the damage to the building as stated in any of the following urls: https://www.emdat.be/classification https://www.start.umd.edu/gtd/downloads/Codebook.pdf for attack types or weapon information, and https://emergency.copernicus.eu/mapping/list-of-activations-risk-and-recovery for event types.

— Damage level: Level of damage suffered by the asset. It shall follow the structure <damage level classification>/<damage level> where <damage level classification> shall be the name of a classification of damage level and <damage level> shall be the level of damage expressed as one of the values stated in the damage level classification.

— Damage Type: a free text indicating the type of damage.

— Damage floor: Number of the floor of the damage inside the asset.

4.4.17 Transport means

The following concepts related with the transport means are included in the semantic layer:

— Transport mean: type of transport. It may be one of the following values:

  — Transport mean Train: Value for type of transport mean train.

  — Transport mean Airplane: Value for type of transport mean airplane.

  — Transport mean Oil Tanker Value for type of transport mean oil tanker.

  — Transport mean Gas Tanker Value for type of transport mean gas tanker.

  — Transport mean Cargo Ship: Value for type of transport mean gas tanker.

  — Transport mean Hospital Ship: Value type of transport mean hospital ship.

  — Transport mean Ocean Liner: Value for type of transport mean ocean liner.

  — Transport mean Bus: Value for specific type of transport mean bus.

  — Transport mean Truck: Value for specific type of transport mean truck.

  — Transport mean Ambulance: Value for type for specific type of transport mean ambulance.

— Is public transport: A Boolean value (yes or not) indicating whether the transport mean corresponds to a public transport.

— Can carry people: A Boolean value indicating whether the transport mean can carry people.

4.4.18 Other concepts

The following concepts are not categorized in any of the previous subclauses and are included in the semantic layer:

— Compound: Chemical compound detected by the sensor.

— Agent type: The type of the agent measured, not to be confused with the compound which is the specific agent.

— Chemical spectrum list: A list of chemical compounds obtained from a measurement.

— Pollutant: the name of a particle, gas, vapour or chemical compound that is present in some physical medium and is polluting it.

— Video stream: a continuous and potentially open stream of binary data representing a video content.

— Audio stream: a continuous stream of binary data representing an audio content.

— Video file: a file containing data representing video content, but it may additionally contain audio content synchronized with the video content.

— Audio file: a file containing data representing audio content.

— Region name: the name of a region, district, state or county that the data provided refers to.

— Population name: the name of the city, town, village or settlement that the data provided refers to.

— Number of inhabitants: number of inhabitants of the corresponding population as stated in population name.

— Sensor message: Message of a sensor in its own native format.

— Event Nature: Nature of the event, with Event Type as synonym, which can be any of the following values

  — Event Nature Chemical, corresponding to events of nature chemical.

  — Event Nature Biological, corresponding to events of nature biological.

  — Event Nature Radiological, corresponding to events of nature radiological.

  — Event Nature Nuclear, corresponding to events of nature nuclear.

  — Event Nature Explosive, corresponding to events of nature explosive attack.

  — Event Nature Natural, corresponding to natural events.

4.5 Definition of the format of the semantic layer

4.5.1 Organization of concepts in different groups

Though it would be conceptually possible to provide a definition that simply states all the values previously listed, the list already demonstrates that there are several concepts with the same name in different environments but corresponding to different physical realities, such as Radiant Energy, which is defined differently for light quantities in ISO 80000-7:2019 [20] and atomic and nuclear physics in EN ISO 80000-10:2019 [23]. Similar or even identical names could be currently being used for different concepts depending on the subject matter that it corresponds to. This is a serious issue for the definition of the semantic layer because it is necessary that each concept is univocally identified by an identifier. Additionally, the fact that the list of concepts already contains hundreds of items makes convenient to organize them in a way that ease searching for a specific item.

The lists of concepts in 4.4.2 to 4.4.17 are organized based on the units provided in the EN ISO/IEC 80000 series [13], plus the additional concepts that are not included in them. The concepts of the semantic layer are organized in the same way.

4.5.2 Syntaxis of the semantic layer

The semantic layer is defined formally so it can be consulted from a computer to use its terms. Additionally, the semantic layer:

— Is written in a formal language whose structure can be checked later and whose elements can be easily accessed later.

— Is as neutral as possible to the technology used for processing it, so its use does not incur in any additional requirement other than text processing for the software referring to them.

— Ensures that each supported concept has a unique name that can be used to univocally refer it.

More specifically, the semantic layer shall be defined as a namespace according to the rules stated in RFC2611 – URN Namespaces Definition Mechanisms. The reasons for defining the semantic layer as a namespace are:

— Namespaces can be made publicly available and located in a fixed url on the internet, which is convenient so they can be easily accessed by any software.

— Namespaces are defined independently, which allows them to be referenced by any standard without the need to change it.

— Some sensor standards, such as OGC-SOS, already support the use of namespaces.

— Their use does not require the use of any additional technology for processing them other than text processing.

All the entries included in the namespace shall be URNs and therefore their structure shall be compatible with the structure of the URN in RFC2141 – URN Syntax.

Additionally, the syntax supports a solution for the following criteria for the names:

— Precise as possible.

— Close as natural language as possible, but subordinated to its precision.

— Easy to use as possible for programmers, which bring the following difficulties:

  — Many concepts already have several synonyms, and it is possible that with time more synonyms will appear, especially due to the preference of precision over common language. Therefore, the syntax should support the definition of synonyms corresponding to the names for the only purpose of looking for the proper corresponding name from a given synonym, especially for those cases where the name provided is generic but there are some exceptions applied to very specific fields. For instance, there is no term for “wind speed” because the term defined in ISO for measuring that is “volume flow rate”. However, it is not likely that a programmer that needs to obtain a wind speed will think in the name “volume flow rate”, when the name “wind speed” is much more obvious for this case.

  — It is necessary to explain the meaning corresponding to the name for consultation. For these reasons, the namespace in Annex D (normative) includes three types of URNs for each concept:

    — An URN indicating the name for the concept.

    — An URN indicating the list of currently identified synonyms for that concept.

— An URN indicating the meaning of the name, possibly referencing to a standardised definition (e.g. the ones included in the EN ISO/IEC 80000 series [13]). Annex D (normative) provides the three types of URNs for the names that correspond to each concept in 4.4.2 to 4.4.17.

The URNs in Annex D (normative) included in this document use the following structure according to RFC2611 – URN Namespaces Definition Mechanisms:

```
<URN> ::=         "urn:" <NID> ":" <NSS> |
                  "urn:" <NID> ":" <NSS> ":synonyms:" <Synonym_list> |
                  "urn:" <NID> ":" <NSS> | ":description:" <description>
```

Where NID is the namespace, identifier, is to be 'SSLy', and <NSS> (Namespace Specific String in the syntax required by RFC2611 – URN Namespaces Definition Mechanisms, which is to have the following format, which is more specific than the one stated in RFC2141 – URN Syntax, but still compatible with it:

<NSS> ::= "general:" <general_concept> |

"space_time:" <space_time_concept> |

"mechanics:" <mechanics_concept> |

"thermodynamics:" < thermodynamics_concept> |

"electromagetism:" < electromagetism_concept> |

"light:" < light_concept> |

"acoustics:" < acoustics _concept> |

"phys_chem_mol_phys:" < phys_chem_mol_phys _concept> |

"atomic_nuclear_phys:" < atomic_nuclear_phys _concept> |

"characteristic_numbers:" < characteristic_numbers _concept> |

"condensed_matter_phys:" < condensed_matter_concept> |

"Info_science_tech:" < Info_science_tech_concept> |

"monitoring:" < monitoring_concept> |

"other:" <other_concept> |

<NSS>'/'<STp>" |

<NSS>":" <version>

<STp> ::= <slash_separated_string>[1)]

<slash_separated_string> ::= {'A'..'Z', 'a'..'z', '_'}

<version> ::= {'0'..'9'}+ |[2)]

<version>'.' {'0'..'9'}

1) Means any number of repetitions of a given set of characters.

2) Means any number of repetitions greater than zero of a given set of characters.

```
<description> ::=   {'A'..'Z', 'a'..'z', '_', ' '}*
```

Synonym_list is a list of Synonyms separated by ',' and delimited by the character "". Formally:

```
<Synonym_list> ::=  "''"" |

                    " <synonym> " |

                    " <synonym> "",""  <synonym_list> "
```

<Synonym> is any String (3.1.13) corresponding to a synonym of the urn associated to the name of that concept.

<description> is any String (3.1.13) corresponding to a description associated to that concept.

NOTE "" Means the character ""

In practice, all URNs of this namespace are formed with their corresponding concept and a prefix (3.1.10) formed by:

— The name of the document, which is SSly. This name is needed for referring it to the semantic layer as explained in following points.

— A context that is the name of the subject matter that the concept applies to, and is organized following the same structure shown in 4.4. However, for a matter of brevity, it is shortened according to the rules explained below.

— Concept is the name of the concept shortened according to the rules below.

The rules for writing and shortening the mentioned fields are:

— For a matter of compatibility with programming languages, the names will replace blank spaces with the character '_'.

— Remove all 'and' and 'a' words.

— Remove all 'of' words.

— Use the following abbreviations:

  — Phys for physics.

  — Chem for chemistry.

  — Info for information.

  — Mol for molecular.

  — Tech for technology.

This structure is designed to allow searching in the document for any name knowing only what the concept is and which is the field that it belongs to. Additionally, it is designed to ease to properly refer the value using a string (3.1.13) formed as follows:

SSLy.<Context>.<Concept>

EXAMPLE: SSLy.Space_Time.Length is the way to refer the concept "Length".

4.6 Formal definition of the semantic layer

The semantic layer is defined as a namespace that contains the three lists of URNs formed from the concepts included in 4.4 and the syntaxis in 4.5.2 is provided in Annex D (normative).

That is, the semantic layer consists in a namespace that for each concept in 4.4 contains:

— an URN with a name that univocally identifies the concept;

— an URN with a list of synonyms for that concept that can be used to locate the name for the concept by searching for each of the synonym in the namespace; and

— an URN with a description of the concept that can be used to check the meaning of the concept.

4.7 Examples of use of the semantic layer

The following examples show how to use in practice the semantic layer jointly with OGC-SOS and OASIS EDXL-CAP.

EXAMPLE 1: Reporting flood measurements and alarms

Design of a system receiving an alarm from a sensor that measures the height of the water at a given location, which is also configured to raise an alarm if that height exceeds a given threshold, but not the threshold itself. The sensor is capable of computing autonomously the need to raise an alarm or not and subsequently isolate the alarm centre from including any additional logic of computing this.

The steps to follow are:

— Clarify what the sensor is required to report. In this example, it is required to report the height of the water and whether there is an alarm or not.

— Search for the concepts in the namespace and check against their correspondent entries of description:

  — urn:SSLy:Space_time:Height whose corresponding entry for the description is "urn:SSLy:Space_'time:Height:description:'As stated in EN ISO 80000-3:2020'". That is, it refers to EN ISO 80000-3:2020 [15], which is compatible with the usual description of height and is therefore suitable for this purpose.

  — urn:SSLy:monitoring:Alarm whose corresponding entry for the description is "urn:SSLy:monitoring:Alarm:description:'Intelligent sensors may use this field to indicate whether a measurement from a sensor should 'trigger an alarm or not'", which correspond with the information searched. The names searched for are urn:SSLy:Space_time:Height for the height and urn:SSLy:monitoring:Alarm for the alarm because they are the ones that contain the searched concepts.

— apply the obtained names jointly with the corresponding standard (OGC-SOS [3] or OASIS EDXL-CAP [6]).

In the case of OGC-SOS [3], it allows several ways to define the names of the properties to be sent, either with SWE (Sensor Web Enablement, [27]) or SML (Sensor Model Language, [28]), which are other standards from the OGC for defining the structure of the information to be sent by the sensor. What is important is, in the case of OGC-SWE [27], it allows defining the fields to be sent by the sensor when registering the sensor. More specifically, when registering the sensor, it is possible to provide a list of fields in the form of providing an attribute for its name:

```
<swe:field name="the_name_of_my_field">
      <!-- more attributes that are not relevant for this example →
</swe:field>
```

And, after that, when the sensor provides their measurements with the service InsertObservation, those measurements would be included in tags field whose property name would be set to the value of our names:

The key point is that the sensor would have to register the fields as:

```
<swe:field name="urn:SSLy:Space_time:Height">
</swe"field>
<swe:field name="urn:SSLy:monitoring:Alarm">
</swe:field>
```

And, when looking for the corresponding properties in the input of the method InsertObservation, or in its content after having saved those contents, it will be enough looking for the fields whose names were urn:SSLy:Space_time:Height for the height and urn:SSLy:monitoring:Alarm for the alarm.

This example uses OGC-SWE [27] but it could use OGC-SML [28] instead. However, the use with OGC-SML[28] may be more complex because OGC-SML [28] allows defining the properties observed at two different levels.

In the case of OASIS EDXL-CAP [6], the 'info' element (EDXL-CAP [6], Section 2.2) includes a field for parameters. Those parameters fields are suitable to provide name-value pairs as the one provided by sensors with the following structure:

```
<parameter>
      <valueName>
            the name of my parameter, ideally from an external namespace
      </valueName>
      </value>the value to be provided</value>
</parameter>
```

In our specific example, providing those values would imply providing the following values:

```
<parameter>
      <valueName>
            urn:SSLy:Space_time:Height
      </valueName>
      </value>1.8</value>
</parameter>
<parameter>
      <valueName>
            urn:SSLy:monitoring:Alarm
      </valueName>
      </value>True</value>
</parameter>
```

EXAMPLE 2: Reporting the agent of a crisis

Design of a system receiving an alarm from a sensor that measures the specific agent of a crisis, which is a chemical compound.

Going to the namespace and search for 'compound' and check against their correspondent entries of description:

urn:SSLy:other:Compound, whose description is urn:SSLy:other:Compound:description:'Chemical compound detected by the sensor', which corresponds with the information searched.

For the case of SOS with SWE, the invocation to RegisterSensor includes the element name:

```
<swe:field name=""urn:SSLy:other:Compound">
</swe:field>
```

In the case of EDXL-CAP, the message includes:

```
<parameter>
      <valueName>
            urn:SSLy:other:Compound
      </valueName>
```

```
	</value>
		the value to be provided
	</value>
</parameter>
```

EXAMPLE 3: Reporting wind speed

Design of a system receiving an alarm from a sensor that measures the wind speed. The wind speed is selected as example for the use of synonyms for two reasons:

— there is already a concept from OASIS EDXL-CAP [6] that means wind speed whose purpose is to include the nature of the crisis, that is, a value for a property whose meaning is the type of crisis, instead of the name of a property; and

— EN ISO/IEC 80000 series [13] do not define any concept that is specific to wind speed. Instead, EN ISO 80000-4:2019 [16] defines the physical property that the wind speed refers to.

Going to the namespace in Annex D (normative) and search for 'wind speed' and check against their correspondent entries of description:

urn:SSLy:Mechanics:Volume_flow_rate:synonyms:'wind speed (specific for wind)'

Description = urn:SSLy:Mechanics:Volume_flow_rate:description:'As stated in EN ISO 80000-4:2019'

That is, the value searched is urn:SSLy:Mechanics:Volume_flow_rate, which is the name that 'wind speed (specific for wind)' is a synonym for.

For the case of OGC-SOS [3] with OGC-SWE, the invocation to the method RegisterSensor of OGC-SOS ([3], section 9.1) includes:

```
<swe:field name="urn:SSLy:Mechanics:Volume_flow_rate">
</swe:field>
```

In the case of OASIS EDXL-CAP, we would include:

```
<parameter>
	<valueName>
		urn:SSLy:Mechanics:Volume_flow_rate
	</valueName>
	</value>the value to be provided</value>
</parameter>
```

The process of looking in the namespace for this example is not different from example 1 of reporting floods. In both cases all that is needed is searching for the mentioned term in the namespace in Annex D (normative). In the example 1 the name is found in the URN in D.1, Annex D (normative) and in this example in the synonyms URN in D.2, Annex D (normative).

EXAMPLE 4: Processing of general values

The semantic layer includes the ability of defining a general value that can be further specialized. This is achieved by appending the character '/' and the name of the specific value to the general value. For instance, the type 'Facility type Electric Power Plant' has several specific values associated for wind turbines, photovoltaic plant, gas plant and fuel plant. Hence, the general value is 'Facility type Electric Power Plant', while 'Facility type Electric Power Plant/Wind Turbine' corresponds to the specific value of a wind turbine, which is also an electric power plant.

The reason for this format of the name is that it allows to easily look for both the general and the specific names. If a program is interested to do a processing for any kind of power plant, then it may look for all names that begin with 'Electric Power Plant', or, more exactly, it may check if the name starts with 'urn:SSLy:Facilities:Electric_Power_Plant', but if it is interested to do any processing that is specific to a wind turbine, it should look for 'urn:SSLy:Facilities:Electric_Power_Plant/Wind_Turbine' instead.

5 Evaluation of the suitability of OASIS EDXL-CAP and OASIS EDXL-SitRep for crisis management in critical infrastructures

5.1 General

OASIS EDXL-CAP [6] defines the format of the messages used for sending alerts. As such, it is meant to be used during the response and training phases of emergency management. OASIS EDXL-SitRep [7] defines the format of the messages used for sending situation reports. It is meant to be used during the response, training and preparation phases. More details on EDXL-CAP [6] and EDXL-SitRep [7] are included in A.2.4 and A.2.6, respectively.

The suitability of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] is analysed for managing a crisis in CIs (3.1.2) according to the evaluation criteria based on the operation needs in clause 4, CWA 17356:2018 [5].

The evaluation was carried out according to the following methodology:

— Definition of the evaluation criteria based on operational needs provided by responders (3.1.11).

— Analysis of the capability of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] to define the messages necessary to support those operational needs.

— Conclusions based on the analysis.

5.2 Definition of evaluation criteria based on operational needs in CWA 17356:2018

5.2.1 General

The evaluation criteria are defined to match the operational needs in CWA 17356:2018, clause 4 4. However, as these operational needs are quite generic, a set of criteria for the case of CIs (3.1.2) and the evaluation of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] are presented in 5.5.2.

This structure is the same as the one in clause 4, CWA 17356:2018 [5], for the operational needs but adapted to the evaluation of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7], because these are specifications that aim to define the structure of the messages to be exchanged between different systems (3.1.15). As such, they can be used to exchange information regarding the crisis, but they are not related with the way that the system (3.1.15) is designed internally. For that reason, the operational needs in clause 4, CWA 17356:2018 [5] that have to do with the design of the system (3.1.15) are excluded from the evaluation (4.4, 4.5, 4.6 and 4.7, which correspond to future proofing, modularity, scalability and fault tolerance, respectively).

5.2.2 Operational needs

5.2.2.1 to 5.2.2.17 present the operational needs identified by the responders (3.1.11) to be necessary supported by any information system (3.1.8) that deals with crisis involving CIs (3.1.2). These operational needs have been evaluated in a TTX carried out in the STRATEGY project. The TTX had the collaboration of several responder (3.1.11) organizations from distinct countries, whose feedback has been used to refine the operational needs.

As OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] are designed to define the format of messages to be transmitted during a crisis, these operational needs are used in 5.3 to check whether it is possible to include the information needed to support those needs in those formats.

5.2.2.1 Identification of the type of affected structure

The information system (3.1.8) of the command and control centre must be able to identify the CI (3.1.2) as listed by the applicable European Directives and Member States national regulations.

5.2.2.2 Identification of the type of alert

The information system (3.1.8) must support the OASIS CAP-AP EVENT CODES LIST [29].

Additionally, the system (3.1.15) must provide the following information of the affected structure:

— Geographical location.

— Name (when applicable).

— Operational status.

— Level of certainty of the information.

— Resources affected.

5.2.2.3 Reception of alert from citizens

The information system (3.1.8) must be able to receive alerts directly from responders (3.1.11) or indirectly through civilians that contact their local governmental jurisdiction, supporting all the information of the crisis as stated in the previous section, but not necessarily including all of them.

5.2.2.4 Reception of general information from citizens

The information system (3.1.8) must be able to receive general information and not only alerts directly from citizens, either civilians or responders (3.1.11). As the citizens may not necessarily be aware of the crisis that the information belongs to, the system (3.1.15) must be able to assign this information to an existing crisis or decide whether to create an alert corresponding to a new crisis.

5.2.2.5 Support for issuing requests to dispatch units

The information system (3.1.8) must be able to send messages corresponding to commands sent to units working on the crisis. These messages must be able to:

— Include details of the resources involved, the specific command.

— Include identifier of the affected unit.

— Support the following types of command:

  — Stablish command post.

  — Stablish Coordination Centre.

  — Send ambulances.

  — Contain contamination.

  — Extinguish fire.

  — Evacuate area.

  — Cordon area.

  — Establish quarantine.

— Secure infrastructure.

— Send measuring teams.

5.2.2.6 Support for the ability to generate and receive situation reports from the critical infrastructures and other institutions

The information system (3.1.8) must be able to support the creation of reports that do not correspond necessarily to an existing crisis but can be sent pre-emptively and periodically as a status notification by a CI (3.1.2) operator or other kind of institution. However, these messages can also be sent during the crisis as an update of the status of a facility. The reports must support the ability to provide information of each type of service and its availability. The evolution of the crisis may cause this availability to change.

Note For instance, a hospital accepts new patients that arrive at the hospital by private ways, causing the availability of beds being much less than the ones reported in the beginning of the day.

5.2.2.7 Ability to generate situation reports on commands issued

The information system (3.1.8) must support the automatic generation of situation reports on the commands issued during the crisis. The support must consist of the automatic collection of all the data to be included in the report and an initial preparation of it, but with the ability of the commander in charge of sending it, amending it or deciding whether to send it automatically without any revision to speed up the process. This feature is different from the ability to issue the command itself because the command is addressed to the team expected to execute it, while the report is often addressed to an upper command level. Additionally, the system (3.1.15) must be able to support both reporting on individual orders and providing a list of issued commands during the crisis.

The information system (3.1.8) must be able to support the following types of reports:

— List of commands issued with the details of the resources involved for each command.

— Status of commands issued, which must include at least the following information:

  — Mission status.

  — Situation status, including.

  — List of resources affected, together with the status of each resource.

  — Estimated number of people affected.

— Reports on specific actions carried out by the infrastructure operator, which must include at least the following information:

  — Action type.

  — Resource affected.

5.2.2.8 Support reports from external services

The information system (3.1.8) must be able to support the creation and reception of the following reports from external services:

— Weather report.

— List of potentially affected populations, including, but not limiting to, a list of affected publicly accessible locations.

— List of affected CIs (3.1.2) within the affected area.

5.2.2.9 Report on the specific CBRNe agent(s) identified for the crisis

The information system (3.1.8) must be able to support the creation and reception of reports that include the following information:

— Identifier of the crisis that the agent corresponds to.

— Agent type.

— Known usages.

— Half-life for radio-active compounds.

5.2.2.10 Support to send instructions to affected municipalities

The information system (3.1.8) must be able to send the following types of instructions to the municipalities:

— Stay indoor: all civilians are entitled to stay in the building where they currently are and the reason for the instruction.

— Evacuate the area, including the evacuation area, the origin and destination points, the waypoints and the reason for evacuation.

— End of emergency: All constrains have finished.

5.2.2.11 Support for municipalities and infrastructure operators to reply to instructions

The information system (3.1.8) must be able to let municipalities to answer to instructions received, and support the following types of answer:

— Acknowledged: The municipality or infrastructure operator acknowledges the reception of the instruction.

— Execution of instruction in progress: The municipality or infrastructure operator reports that it is currently working on the execution of the instruction, but it has not finished yet.

— In this case the message must also include estimated time for finishing the execution of the instruction.

— Instruction executed: The municipality or infrastructure operator reports that it has successfully finished executing the instruction received. In this case the message must also include estimated time for finishing the execution of the instruction.

— Unable to comply: The municipality or infrastructure operator reports that it is unable to execute the instruction received. In this case the message must include the reason that is keeping the municipality to execute the instruction.

In all cases, the answer must include the identifier of the instruction that the answer corresponds to, the time of reception of the instruction and the time of issuing the response.

5.2.2.12 Support to send instructions to infrastructure operators

The information system (3.1.8) must be able to send the following types of instructions to the infrastructures operators:

— Stop operation: include list of services to be stopped, such as the road or train line affected, and the reason for declaration.

— Send update on status: the operator is instructed to send a situation report updating of its status as soon as possible.

— Send impact report: the operator is requested to send a situation report on how the crisis is affecting its operation.

— End of emergency and the reason for declaration.

5.2.2.13 Support for the direct reception of data from sensors

The information system (3.1.8) must be able to receive data directly from sensors (3.1.12), so they can be processed and potentially generate or report an alert from the received data or the commanders decide to declare the end of a crisis.

5.2.2.14 Support coordination with hospitals during the crisis

The information system (3.1.8) must support the following type of information exchange with the medical centres:

5.2.2.14.1 Live update of the clinical history of the patients assigned to the hospital

The medical centres must be able to access the clinical information gathered during the crisis of any patient assigned to it from the very moment that the assignment took place and receive live any update on the status of the patient, so the hospital can prepare any needed resources to treat the patient as soon as he arrives the hospital.

The medical centres must be capable of updating that information on its own once the patient has been admitted, so the information system (3.1.8) is aware of the evolution of the patient, and more importantly of updating the statistics about the overall clinical situation.

5.2.2.14.2 Live update of the geographical position of the ambulances assigned to the hospital

The information system (3.1.8) must provide to the medical centres access to live geographical positioning of the ambulances, together with a list of the patients transported in them.

5.2.2.14.3 Clinical report of the patients assigned to hospitals

The information system (3.1.8) must provide to the medical the ability to create a summary report on the patients assigned to them, including grouped statistics of the number of patients assigned from the crisis, how many of them have died, how many are grave, and how many have been released.

5.2.2.15 Support for the preliminary detection of known terrorists during the crisis

In the case of terrorists' attacks, the information system (3.1.8) must be able to perform a preliminary detection of any terrorists that could still be in the location of the crisis or its vicinity, because they could be preparing another attack. For this reason, the system (3.1.15) should be able to send messages warning about the identification of known terrorists, together with their last known geographical

position and the photographs / videos that were used to identify them so the police can check their identity.

The EU Artificial Intelligence Act [30] currently states: "*the use of 'real-time' remote biometric identification systems in publicly accessible spaces for the purpose of law enforcement*", is prohibited, which is the reason why this feature must not be activated by default. But it also allows the following exception: '*unless and in as far as such use is strictly necessary for one of the following objectives: "*and " *(ii) the prevention of a specific, substantial and imminent threat to the life or physical safety of natural persons or of a terrorist attack*". That is, the remote biometric identification is permitted if it is strictly necessary to prevent imminent threats to people or a terrorist attack. For that reason, the information system (3.1.8) must provide for those cases the ability for a crisis commander to turn on this feature for the whole duration of a crisis in a single click.

5.2.2.16 Authentication and authorization capabilities

The system (3.1.15) must be able to identify who is trying to access it and properly check that s/he/it is authorized to do so, both in the graphical application and in any software that may be exposed to provide any of these functionalities. Though this feature is not directly related with the use OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7]. It is indirectly related with the majority of the rest and functionalities, which is the reason why it is included here, even if OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] will not be evaluated against this feature because it is out of their scope.

5.2.2.17 Support for JSON format

The responders (3.1.11) recommend that the information system (3.1.8) supports the JSON format (ISO/IEC 21778:2017, [31]) for the transmission of data.

5.2.3 Detection reliability

The system (3.1.15) should ensure that a high percentage of the incidents (3.1.6) are detected and take measures to minimize the number of false positives.

5.2.4 Simulation capabilities

The information system (3.1.8) must be able to be used jointly with a simulation service to test the rest of operational needs stated in this document.

5.2.5 Provision of external interfaces

The information system (3.1.8) must provide external interfaces for accessing the data of the crisis.

5.3 Analysis of the capability of OASIS EDXL-CAP and OASIS EDXL-SitRep to support the operational needs

5.3.1 General

This clause studies whether OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] can support the operational needs in 5.2.2.

In general terms, it analyses their capability to support each operational need, but only where that operational need is related with the OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] scopes. As a result, in most of the subclauses, the analysis only studies the suitability of one of those two standards. In this case, the omission of the other means that it is not studied because it is considered to not be suited for that operational need.

The analysis of the general operational needs consists in checking that the information necessary to implement each operational need can be included in either an OASIS EDXL-CAP [6] or an OASIS EDXL-

SitRep [7] message. And the check is carried out by identifying the exact fields of the messages of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] that match each piece of that information.

These messages, as all messages complying with any of the standards of the OASIS EDXL set of standards, are designed to be embedded as the payload of an OASIS EDXL-DE [9] (distribution element) message. The OASIS EDXL-DE [9] message is used for the distribution of the payload to their recipients and for letting the recipients of the message to reply to it. For that reason, some of the features that rely on this capability are analysed supposing that the OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] message is delivered through this mechanism. In those cases, the dependency on such mechanism is explicitly stated in the text. Though it is theoretically possible to use other mechanisms to implement those features, they are out of the intended use of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] and for that reason they are not analysed in this document.

Apart from that, there is a consideration that affects several clauses: free text fields are adequate for giving information to commanders, but they do disallow performing any additional automatic processing on them, because there is no way to know what this field will exactly contain or its format. For that reason, it is advisable that any specification limits the use of these fields to the strictly unavoidable cases.

Note For instance, it is reasonable to use a free text field for stating the CBRN agent that is causing the crisis because it is almost impossible to provide a full list of all possible applicable values. But this has the drawback that the lack of a list of predefined possible values makes it very difficult to build any automatic processing on that field because any program needs to check every possible value with their proper processing. This is the reason why when there are several standards available for supporting a functionality, it is normally better to use the one that provides non-free fields whose possible values are already defined in the standard.

5.3.2 Analysis

5.3.2.1 Identification of the type of structure affected

Neither OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] supports this, except for the ability of OASIS EDXL-CAP [6] to provide parameters with the format of name/value, but there is still a lack of the name of the parameter and the values. For this purpose, it would be possible to use the parameter names and values in 4.4.15.

EXAMPLE: For indicating the type of infrastructure corresponding to an oil refinery, this could be indicated as following:

```
<parameter>
	<valueName>
		urn:SSLy:facilities:Facility_type
	</ValueName>
	<value>
		urn:SSLy:facilities:Facility_type_Oil_Refinery
	</value>
</parameter>
```

5.3.2.2 Identification of the type of alert

OASIS EDXL-CAP [6] has a field ‘Event Type’ with a predefined list of events that are suitable for defining the type of alert.

5.3.2.3 Reception of alert from citizens

OASIS EDXL-CAP [6] is not affected by the precedence of the information, It is not advisable that the alerts are introduced in the system (3.1.15) by civilians and it is preferred that civilians call their respective

governmental police, such as a police station to provide the information After that, it is up to that office to issue the proper alert. In any case, OASIS EDXL-CAP [6] is defined specifically for the reception of alerts. The fields for this message are included in the Id RAC Table B.1 in Annex B (informative).

However, the field that includes predefined values, which is category, includes only a list of thirteen possible incident (3.1.6) types and only one for 'CBRNE'. Hence, there is no way to provide a specific processing for chemical incidents (3.1.6) that is different from the biological one with only this type.

5.3.2.4 Reception of general information from citizens

OASIS EDXL-CAP [6] supports the reception of general information in its field description, which is a free text field. Hence OASIS EDXL-CAP [6] supports this functionality.

5.3.2.5 Support for the automatic reception of alerts generated by sensors

OASIS EDXL-CAP [6] supports the automatic reception of alerts generated by data coming from sensors (3.1.12). This is not the same thing as receiving data from sensors (3.1.12). An intelligent sensor (3.1.12) could send an OASIS EDXL-CAP [6] message with an alert stating the type of alert in its event type, and could even include the data from the measurement that has originated the alert as parameters in the message, but this will still the following limitations:

— Though the information of the sensor (3.1.12) to be included as a parameter may be input in a format that is compliant with any standard for sensors (3.1.12), there is no definition in OASIS EDXL-CAP [6] that states the name for the parameter to be included with that information. This forces the developer of the module receiving the alert to have internal knowledge of how the sensor (3.1.12) is sending the information, which is the opposite to use a standard.

— Though a sensor (3.1.12) might send each measurement gathered as an alert, that is not appropriate, because not all measurements need to trigger an alert. A possible solution could be that the sensor (3.1.12) sends all successive alerts that follow the first one as an update of the first alert, but for that the sensor (3.1.12) would need to keep track of the identifier of the first alert or at least to support additional logic. This additional logic would either have to track the status of the alerts or communicate with the software that is doing so, to know when to report the alert as an update or as a new alert.

In any case, regardless of the format of the data sent by the sensors (3.1.12), it is possible that a software receives the data from a sensor (3.1.12), analyses it and decides on whether to trigger or not an alarm from it, producing the appropriate OASIS EDXL-CAP [6] message. Hence, OASIS EDXL-CAP [6] supports the automatic reception of alerts generated by data coming from sensors (3.1.12), but indirectly. A way to send the data from sensors (3.1.12) to this software is still needed so it can analyse the data to trigger the alert (seeC.1.3). The fields for this message are included in Id RAS, Table B.1 in Annex B (informative).

5.3.2.6 Support for issuing requests to dispatch units

Neither OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] are conceived for sending requests/commands. The closest feature they provide is the field 'instructions' in the OASIS EDXL-CAP [6] message, that is an unformatted-free text field to provide indications on how to proceed to the receiver of the alert. However, precisely because this field is a free text, it can hardly support any automatic process for the request, which makes a much better choice to use any standard conceived for sending commands. Two possibilities for this are either OASIS EDXL-RM [12] or ISO/TR 22351 [1]. However, the closest fields to achieve this with OASIS EDXL-CAP [6] are included in Id RDU, Table B.1 of Annex B (informative).

5.3.2.7 Support for the ability to generate and receive situation reports from the critical infrastructures and other institutions

A very important limitation of OASIS EDXL-SitRep [7] is that it is conceived to send only situation reports that are assigned to a crisis. As a result, any OASIS EDXL-SitRep [7] message must include a field incidentID that identifies the crisis/incident that the message is reporting about. The specification of OASIS EDXL-SitRep [7] states explicitly that 'Unknown' is a valid incidentID, and probably 'None' would also be valid because the field is defined to be String field (3.1.14), they are both valid Strings (3.1.13), which is the type of token that this field accepts. However, OASIS EDXL-SitRep [7] does not stablish any kind of special meaning for these fields. Therefore, though the standard admits that any application uses 'None' as a valid incidentID, it would only mean that there is an actual incident (3.1.6) whose id was 'None'. However, in practice, the only difference between a periodic situation report and a normal OASIS EDXL-SitRep [7] report is that there is no incident to assign the report. Therefore, if OASIS EDXL-SitRep [7] allowed this field to be empty or assigned a special value 'None' to correspond to the situation where there is no incident (3.1.6) yet, OASIS EDXL-SitRep [7] would perfectly suit for these kinds of situation reports.

Regardless of the suitability of OASIS EDXL-SitRep [7] to support these kinds of situation reports, there are other standards that can be appropriate to send this information depending on the nature of the information to be sent. More specifically, OASIS EDXL-HAVE (HL7) [10] could be appropriate to handle the sending and reception of this information.

5.3.2.8 Ability to generate situation reports on commands issued

In this case, the suitability of OASIS EDXL-SitRep [7] depends on the specific type of report:

— For the case of the List of Commands issued, including details of the resources involved for each command, it is possible to use OASIS EDXL-SitRep [7] messages for the Management Report Summary and Decision Support Information. The fields for this message are included Id LC, Table C.1 in Annex C (informative).

— For the case of Mission status, it is possible to use OASIS EDXL-SitRep [7] in the field observation report for this purpose. However, OASIS EDXL-RM [12] is better suited for this. In any case, the fields that may be used for this purpose in OASIS EDXL-SitRep [7] are included in Id MS, Table C.1 in Annex C (informative).

— For the case of List of resources affected, including their status, OASIS EDXL-SitRep[7] can support this. As this case is a very generic one, there is no point in stating the type of report that can support it, because it will depend on the nature of the resources.

— Estimated number of people affected: OASIS EDXL-SitRep [7] can support this with the Casualty illness summary report, but there is no support for a general report that covers all type of affected people, such as evacuated or radiated people. The fields that may be used for the clinical report in OASIS EDXL-SitRep [7] are included in the Id CI (3.1.2), Table C.1 in Annex C (informative).

Regarding the reports on specific actions carried out by the CI (3.1.2) operator, including the action type and resource affected, both OASIS EDXL-SitRep [7] and OASIS EDXL-RM [12] can be used for this, but OASIS EDXL-RM [12] is possibly better suited, because OASIS EDXL-SitRep [7] is focused in reporting the situation, while OASIS EDXL-RM [12] is more focused in the resource management, including orders to manage them. In any case, the field to be used for this with OASIS EDXL-SitRep [7] would be the Response Resource Summary.

5.3.2.9 Support reports from external services

Actually, it is impossible for either OASIS EDXL-SitRep [7] or any OASIS EDXL standard [2] to support all possible reports from any external services. However, for the case of the requested types of reports, the information to be provided for those reports was already taken into account when defining OASIS EDXL-SitRep [7], and therefore, it can support the following requested types of report:

— Weather report, whose fields are included in Id WR, Table C.1, in Annex C (informative).

— List of potentially affected populations, whose fields are included in Id PAP, Table C.1 in Annex C (informative).

However, neither OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] support reporting the list of CIs (3.1.2) detected, among other reasons, because they do not have a way to identify the type of infrastructure detected. Additionally, though OASIS EDXL-CAP [6] allows for the inclusion of resources associated with the alert, there is no way to indicate that they correspond to an infrastructure affected by the incident (3.1.6), or its level of damage.

5.3.2.10 Report on the specific CBRNe agent(s) identified for the crisis

Though both OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] can support the specific type of CBRNe agent, including his half-life (field duration) and known usages, there is a difficulty with the name of the agent. It is almost impossible to produce a list of all possible agent names, because it would need to contain as many agent names as the sum of the number of all possible chemical compounds, plus all possible microorganisms. This is unpractical, and for that reason the best that these standards offer is a free text field, hindering the ability to provide any kind of automatic processing based on the specific agent detected.

Finally, there is no field in either OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] to indicate the possible usages of the detected CBRNe agent.

The fields that can be used in OASIS EDXL-SitRep [6] for indicating the type of CBRN agent are included Id CAT, Table C.1 in Annex C (informative).

5.3.2.11 Support to send instructions to affected municipalities

Though OASIS EDXL-CAP [6] is not designed for sending commands to the units, it can provide basic instructions in the field ‘Instructions’. Hence, it can be considered that it can support this feature.

5.3.2.12 Support for municipalities and infrastructure operators to reply to instructions

The following types of response are supported:

— Acknowledged: The municipality or infrastructure operator acknowledges the reception of the instruction.

— Unable to comply: The municipality or infrastructure operator reports that it is unable to execute the instruction received. In this case the message must include the reason that is keeping the municipality from executing the instruction.

— Rejected: The message could not be delivered due to technical reasons. That is, the information system (3.1.8) of the municipality cannot process the message and for that reason it has not arrived to the municipality staff.

The following types of responses are supported only for some predefined types of reports:

— Execution of instruction in progress: There are a number of possible responses for limited purposes, but not a single message that handles whatever is needed in a status report.

— Instruction executed.

The way that OASIS EDXL-SitRep [6] supports this is that it is possible to issue another message corresponding to a mission status setting the field DistributionType to a proper value. The values to be set for that purpose are included in Annex C (informative) with the rest of the fields corresponding to the report of Mission Status in Id MS, Table C.1 in Annex C (informative).

5.3.2.13 Support to send instructions to infrastructure operators

OASIS EDXL-CAP [6] can support all the requested operations in its 'instructions' field, but as it is a free text message, it does not allow to provide any automatic processing in the operator side. For that it would be necessary to use OASIS EDXL-RM [12] instead. In any case, the fields for sending such message are the same ones as for sending messages for requesting the dispatch of units, and therefore they are included in Id RDU, Table B.1 in Annex B (informative).

5.3.2.14 Support for the direct reception of data from sensors

Neither OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] are conceived to include data coming from sensors (3.1.12). Such data can only be included as initial parameters, which could fit the initial triggering of the alarm, but would hardly be convenient for periodic reporting of the sensors (3.1.12), because these sensors (3.1.12) may be designed to send data every second and there is less point in producing an alarm for each of them.

Though it might be possible to provide the information of sensors (3.1.12) as parameters in OASIS EDXL-CAP [6] and use the semantic layer proposed in this document to define the names of the parameters, this approach could serve for sending alerts and the initial values of the measurements. But this approach would force to send an alert for each measurement taken. This would be also values for measurements corresponding to safe values, because they would be necessary to report on the finalisation of the crisis. Sending each measurement embedded in an alert could not only increase unnecessarily the traffic of data in the system (3.1.15), but it could also hinder the comprehension of alerts by the users, due to generation of excess alerts from sensors (3.1.12).

A more reasonable approach is sending the measurements of sensors (3.1.12) in separate messages complying with any standard for the definition of data from sensors (3.1.12), such as OGC-SOS [3]. In this case, the names to be included in the messages from the sensors (3.1.12) can be extracted from the semantic layer.

5.3.2.15 Support coordination with hospitals during the crisis

The system (3.1.15) must support the following type of information exchange with the hospitals.

5.3.2.15.1 Live update of the clinical history of the patients assigned to the hospital

Neither OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] are conceived for transmitting the clinical information of the patients during the crisis. In fact, there is another standard conceived for this, which is OASIS EDXL-TEP [11].

5.3.2.15.2 Live update of the geographical position of the ambulances assigned to the hospital

Not even OASIS EDXL-TEP [11] supports the tracking of the geographical position of the ambulance assigned to a patient. However, OASIS EDXL-TEP [11] includes a field to state the ambulance assigned to

a patient. Hence, it is possible to implement this functionality by combining OASIS EDXL-TEP [11] for the clinical information of the patient and linking it with a positioning sensor (3.1.12) in the ambulance.

5.3.2.15.3 Clinical report of the patients assigned to hospitals

OASIS EDXL-SitRep [7] supports this with the Response Resources Summary Report. The corresponding fields are included IdCR, Table C.1 in Annex C (informative).

5.3.2.16 Support for the preliminary detection of known terrorists during the crisis

OASIS EDXL-CAP [6] supports this feature partially because it includes an unstructured field in the distribution element to send this information. This field can contain a picture of a terrorist, whose description can be set to indicate that the picture/video matches with a known terrorist, and also his name and the percentage of match. This, used jointly with an event type explaining the identification of a known terrorist can support this feature. However, a more advanced processing could possibly need to add more information fields for this feature, such as a connection with a police information service. Additionally, though the description of the resource may include the indicated information, it is currently set as a free text, and therefore it would be a better practice to upgrade OASIS EDXL-CAP [6] to contain a list of possible threats that support this feature.

The fields to be used for such alert are included in Id IKT, Table B.1 inf Annex B (informative).

5.3.2.17 Authentication and authorization capabilities

Neither OASIS EDXL-CAP [6] or OASIS EDXL-SitRep [7] currently include any specific field for authentication or authorization because it is out of their scope. But this is not necessarily a limitation, because current technology trends on this feature tend to extract all security functionalities to an external security layer.

5.3.2.18 Support for JSON format

OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] are based on XML and they do not support the JSON format for the moment, but they are working on doing so, as stated [2].

5.3.3 Detection reliability

OASIS EDXL-CAP [6] includes a field for stating the certainty level of an alarm. Apart from that, the reliability of the detection does not rely on the format of the messages transmitted, which is the scope of the OASIS EDXL standards. The field for this is included in Id DR, Table B.1 in Annex B (informative).

5.3.4 Simulation capabilities

Both OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] can work with simulated data and therefore can be used in simulations, but it is out of their scope to provide the simulation software.

Additionally to that, these capabilities are supported by the OASIS EDXL-CAP [6] <status> element, defined as “The code denoting the appropriate handling of the alert message (REQUIRED)”, which accept the Code Values:

— “Actual” - Actionable by all targeted recipients.

— “Exercise” - Actionable only by designated exercise participants; exercise identifier SHOULD appear in <note>.

— “System” - For messages that support alert network internal functions.

— “Test” - Technical testing only, all recipients disregard.

— “Draft” - A preliminary template or draft, not actionable in its current form.

Hence, a CAP message with <status>Exercise</status> is able to seamlessly support system (3.1.15) simulation capabilities.

5.3.5 Provision of external interfaces

Both OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] are public standards that define the exchange of messages between different information systems (3.1.8). Hence, they support this operational need.

5.4 Conclusions on the evaluation

Both OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] are standards conceived for defining the information to be transmitted during a crisis with different scopes. OASIS EDXL-CAP [6] is defined for the transmission of alerts and OASIS EDXL-SitRep [7] for the creation of situational reports, and as such, they are suited for these goals with some needs of improvement that come from the new functionalities. However, there are other needs that exceed the scope of these standards and therefore some other complementary standards are more suited for this.

More specifically, the following groups of information are out of the scope of these standards:

— The transmission of data from the sensors (3.1.12), which can be carried out using a standard specific for that, such as OGC-SOS [3].

— The sending of commands and requests to the units, which can be carried out either with OASIS EDXL-RM [12] or ISO/TR 22351 [1].

— The logistics aspects of the crisis, which can be carried out either with OASIS EDXL-RM [12] for general purposes or OASIS EDXL-HAVE [10] for clinical supplies.

— The clinical information of the patients, which can be transmitted with OASIS EDXL-TEP [11].

— The periodic availability reports from hospitals, which can be transmitted with OASIS EDXL-HAVE [10].

Apart from this information, which can be transmitted using any of the mentioned alternatives, this document has also identified the possible improvements for OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7]:

— The main lack of OASIS EDXL-CAP [6] and OASIS EDXL-SitRep [7] when dealing with emergencies that involve CIs (3.1.2) is the lack of a field for expressing the type of CI (3.1.2) or even the type of facility affected. Though it is still possible to indicate that in the field ‘Event’ of OASIS EDXL-CAP [6], this field is a free text and for that reason it does not allow associating any automatic process based on the type of infrastructure affected. For that reason, the main recommendation from these conclusions would be to include the type of infrastructure affected in the free text field event till OASIS offers a better solution for this.

— There is a need for availability reports from the CIs (3.1.2). As the main difference of these reports with a situation report will be that these availability reports do not need to be assigned to an incident (3.1.6), it could suffice to let the ‘incidentID’ field of the situation report to be empty or to define a special value ‘None’ to be used for that field in this case.

— The list of categories included in OASIS EDXL-CAP [6] that states the type of incidence only includes nine types of categories and only ‘CBRNE’ for any type of ‘CBRNE’ incidents (3.1.6). It would be interesting that OASIS EDXL-CAP [6] expands this list in future versions with a more fine-grained process of the information.

— OASIS EDXL-DE [9] can provide partially the status of a previous request, but it does not have any way to express that it is not possible to comply with a request.

— OASIS EDXL-CAP [6] could benefit from the inclusion of a field to state the type of structure affected.

— OASIS EDXL-CAP [6] does not include any fields for indicating threats associated to an incident (3.1.6), such as known terrorists located in its scene. The best that OASIS EDXL-CAP [6] offers for this is using the resource element to include resources that can be associated to the threat and explain that in the free text fields, such as the description. But the usage of free text fields hinders any automatic processing, because it requires embedding in the software knowledge about the format and meaning of that free text that is not defined in the standard. For that reason, OASIS EDXL-CAP [6] could benefit from adding support for threats associated with an incident (3.1.6).

Annex A
(informative)

Analysis of compatibility with other standards

A.1 General

This annex analyses for informative purpose, which standards already exist for defining the format of the information to be transmitted during a crisis and how to keep compatibility with them according to the criteria in 4.3. With this purpose, it presents a study on the existing standards and how to keep compatibility with them. As for many of them, the way to keep that compatibility is to omit their concepts from the semantic layer, it also includes a section which explains which information is included in those standards and selected to be left out of the scope of the semantic layer.

A.2 Study of the landscape of existing standards on crisis management

A.2.1 General

This clause presents a high-level overview of the standards that already define the meaning of the information to be transmitted during a crisis. None of those standards are designed to cover the definition of all possible information but only part of it. The standards and initiatives relevant for this study are only those ones that include the definition of the meaning of the information to be transmitted, at least implicitly. The standards that are related with crisis management but not with the definition of the meaning of the data to be transmitted are not relevant for this study.

EXAMPLE: TLS deals with cyphering transmissions and authenticating peers. It is used in crisis management but it is not considered because it does not deal with the meaning of the information transmitted.

These standards refer to complex sets of information that involve complex data structures that are related with each other, normally using keys that identify each element of a structure. The fields that correspond to such keys, which are often named identifiers, often include the suffix id for that reason. These fields are necessary to structure the information and for letting the message to refer to any information that was previously received. That is, the keys are not included in the message to provide any information on its own, but to be used as a link to the rest of information. For that reason, the fields corresponding to the keys are not considered to be concepts to be taken into account. Hence, they are excluded from the semantic layer.

Additionally, some of these standards refer to some type of message or order types that are specific for them, such as OASIS EDXL-RM [12], which includes a type for message content (MessageContentType) that basically refers to the type of message being sent, but this information corresponds to the flow of messages inside the protocol, and therefore does not correspond to any information that is necessary to be sent outside of that protocol. For that reason, these kinds of fields are not considered in this section to be removed from the semantic layer, either, as they only have sense when used in their respective protocols and therefore, they would never be included in the semantic layer, making unnecessary to contemplate the need for their removal.

A.2.2 ISO/TR 22351

ISO/TR 22351 [1] is the ISO Technical Report for data transmission in crisis management. It is an API (3.1.1) oriented document specific for crisis management. As such, it already covers a limited set of concepts that the semantic layer should not include. However, it does not provide a way to include information provided by sensors (3.1.12) except for the fields included in its specification.

A.2.3 OGC-SOS v2.0

The Sensor Observation Service (SOS) from the Open Geospatial Consortium (OGC) [3] is a standard that defines the format of data transmitted from geographically referenced sensors (3.1.12). It is built on SensorML [28]. Both are part of the Sensor Web Enablement (SWE) [27] family of standards suggested in CWA 17356:2018 [5] for the transmission of data from sensors (3.1.12). Additionally, it is compatible with standard WMS (Web Map Service, [33]), which is a standard commonly used by Geographic Information Systems (3.1.5) to display geographical maps, and therefore one of the key standards in the development of command and control centres.

Though OGC-SOS [3] is an API (3.1.1) oriented for the transmission of data of sensors (3.1.12), the format of the message for transmitting the data is based on sending the name of the concepts (which are referred as 'observer properties' in OGC-SOS [3]) and their values. As such, it is an ideal candidate for the use of a semantic layer for the definition of such names. Moreover, it already provides a way for defining the meaning of the fields sent and even a solution also based in namespaces. It even provides suggestions for the name structure of their URNs. What OGC-SOS v2.0 [3] does not provide is a list of URNs that define the possible meanings of information. Therefore, the semantic layer defined in this document seems to be an ideal counterpart for OGC-SOS [3] if it is built using the proposed structure of OASIS for the construction of URNs.

A.2.4 OASIS EDXL-CAP v1.2

Emergency Data Exchange Language (EDXL) Common Alerting Protocol (CAP), 2012 [6] is a protocol for sending alerts during a crisis-emergency, endorsed by OASIS Open. OASIS EDXL-CAP [6] is a (almost) fully API (3.1.1) oriented protocol. It is deliberately focused to define the information to be included in alerts. However, it still includes a <parameter> field for including raw data from a sensor (3.1.12) without entering the structure of that message. That is, its implied philosophy is that the format of the data sent by the sensors (3.1.12) is out of its scope, but it still allows including sensor (3.1.12) data to complement the information of the alerts, and this sensor (3.1.12) data may (and should) comply with some standard for the definition of the format of messages sent by sensors, such as OGC-SOS [3].

The "parameters" field of OASIS EDXL-CAP [6] provides a large degree of freedom to describe specific data in a standard format. But different senders can use the same parameters with different meanings. OASIS EDXL-CAP [6] has also been specifically designed to describe alerts, together with the intended recipients and the geographical area that the alert refers to. The use of OASIS EDXL-CAP [6] to embed sensor (3.1.12) readings could substantially increase the size of the messages, without providing substantial advantages.

A.2.5 OASIS EDXL-DE v1.0

OASIS Open, Emergency Data Exchange Language - Distribution Element v1.0 (2006) [9] is the envelope or "wrapper" of the OASIS EDXL-CAP [6] Alert (Payload) or any of the other OASIS EDXL messages. OASIS EDXL-DE v1.0 [9] specifies the XML tag <targetArea> for distribution of the payload message, and the XML tag <contentObject> as the container element for specific messages. OASIS EDXL-DE v1.0 [9] is the preferred version for its straightforward simplicity.

NOTE Though there is a version 2.0 of EDXL-DE [9], version 1.0 is the preferred version, and is used more than 2.0.

A.2.6 OASIS EDXL-SitRep v1.0 (2016)

OASIS Emergency Data Exchange Language Situation Reporting) Version 1.0. (2016) [7] describes a set of standard reports and elements that can be used for data sharing among emergency information systems (3.1.8), and that provide incident (3.1.6) information for situation awareness on which incident (3.1.6) commanders can base decisions. Though OASIS EDXL-SitRep [7] is completely applicable to crisis management in CIs (3.1.2), its support is a special case compared with the rest of standards to be supported. In the rest of cases the compatibility with the standard consists in avoiding the collision of scope by keeping the concepts covered by the supported standard out of the semantic layer, and possibly adapting the structure of the semantic layer to be compatible with the philosophy of the supported standard. But in the case of OASIS EDXL-SitRep [7] the collision is mostly impossible for the following reason: the semantic layer is conceived to express concepts from devices (mainly sensors (3.1.12)) that collect information from the crisis. OASIS EDXL-SitRep [7] is conceived to produce situational reports that summarize this collected information, but it is not designed to report it directly. And in the exceptional case where a situational report would include information collected directly from the field, the way that OASIS EDXL-SitRep [7] defines for providing it is through the use of external namespaces, such as the semantic layer defined in this document. The way that the semantic layer supports OASIS EDXL-SitRep [7] is including their concepts in an external namespace that can be referenced in OASIS EDXL-SitRep [7].

A.2.7 OASIS EDXL-HAVE v2.0 / HL7 v2

OASIS EDXL-Hospital Availability Exchange v2.0 [10] is an XML messaging standard primarily for exchange of information related to health facilities in the context of emergency management. Its objective is that first responders (3.1.4), emergency managers, coordinating organizations, hospitals, care facilities, and the health community can provide each other with a coherent view of the health system (3.1.15). It provides a way for communicating a snapshot of the local area Emergency Medical Service/Systems in an emergency incident (3.1.6) and updating information for responders (3.1.11) to direct emergency patients to a facility that has the capability to treat those patients more efficiently. OASIS EDXL-Have was used during the 2010 Haiti earthquake, and the lessons learned from that event have been brought into OASIS EDXL-HAVE v2.0 [10]. One of the chief takeaways that the need for such instant snapshot of the local area Emergency Medical Service/Systems.

Of the two health-related OASIS specifications, OASIS EDXL-HAVE v2.0 [10] supplies the most current availability of equipment (including beds) and personnel in an emergency incident's (3.1.6) area, which allows responders (3.1.11) to also gather and transmit the patient's vital signs and send it on ahead of the patient.

Used in conjunction with OASIS EDXL-TEP v1.1 [11] and the Transformation Committee Note, it defines the format for the information of emergency patients being transported to best match among the area's Health Community medical facilities and teams. This allows the first responders (3.1.4) to have the most current information available to make the most effective decisions.

Similarly to OASIS EDXL-HAVE v2.0 [10], OASIS collaborated with HL7 to craft a follow-on document setting forth a mapping of term-datatypes between HL7 v2 and OASIS EDXL-TEP v1.1 [11].

A.2.8 OASIS EDXL-TEP v1.1

OASIS Emergency Data Exchange Language (EDXL) Tracking of Emergency Patients (TEP) Version 1.1 (2018) [11], is an XML messaging standard primarily for exchange of emergency patient and tracking information from the point of patient encounter through definitive care admission or field release. OASIS EDXL-TEP v1.1 [11] defines the format of the messages used for transmitting the route and the triage assessed for emergency patients, which allows the best match for the patient's injuries or illness and a quicker response. At the same time, a system (3.1.15) sending OASIS EDXL-TEP [11] messages can reduce or eliminate the need to re-keyboard the patient's information. This also reduces the time needed at the destination facility because the vitals and incidental information can be sent ahead to the medical

institutions, in the form of the receiving organization's version of HL7 v2's based form, the Admit, Discharge, or Transfer form.

Along with OASIS EDXL-HAVE v2.0 [10] and the OASIS TEP v1.1 [11] -HL7 v2-Transforms-v1.0, these specifications can allow systems (3.1.15) implementing them to provide a better Emergency Medical Service/System crossing national and-local boundaries, though it does need to be translated into the required languages.

Of the two health related OASIS specifications, OASIS EDXL-TEP v1.1 [11] supplies the patient centered information to complement and work with the healthcare availability information of OASIS EDXL-HAVE v2.0 [10].

A.2.9 OASIS EDXL-RM v1.0

OASIS Emergency Data Exchange Language Resource Messaging (EDXL-RM) v1.0 (2008) [12], describes 'a suite of standard messages for data sharing among emergency and other information systems (3.1.8) that deal in requesting and providing emergency equipment, supplies, people and teams'. As such, it may be used for handling all type of messages for logistics and commands.

A.3 Subject matters out of the scope of the semantic layer

A.3.1 General

This clause identifies the different subject matters that are covered by a standard that already provide a mean to define the meaning of their concepts. The objective is to identify the pieces of information included in those standards to make sure the semantic layer does not include them.

A.3.2 Information included in ISO/TR 22351

Figure A.1 illustrates the elements that compose an Emergency Management Shared Information (EMSI) message.

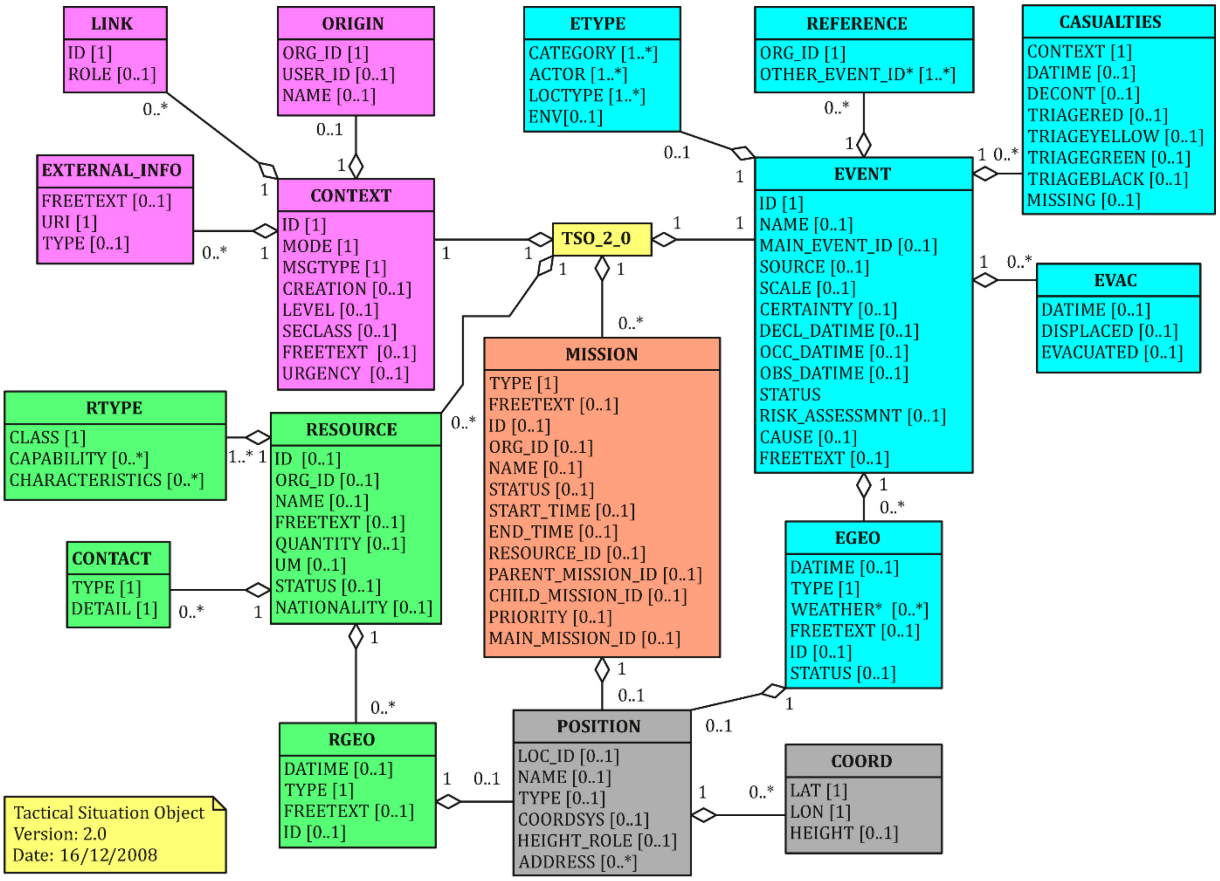

Figure A.1 — Elements that comprise an EMSI message from CWA 15931-1:2009

NOTE Figure A.1 is equivalent to Figure 1 in ISO/TR 22351:2015.

The following concepts are covered by the structure of an EMSI message and therefore they are not included in the semantic layer:

— Dates and times corresponding to the information transmitted.

— Geographical coordinates corresponding to the information transmitted.

— Overall statistics of the number of casualties together with their decontamination and triage status, as shown in the ‘casualties box’ in Figure A.1.

— Number of displaced and evacuated people, as shown in the ‘evac box’ in Figure A.1.

— Resources (teams) available in the crisis, including their amounts, status and nationality, as stated in the ‘resource box’in Figure A.1.

— Capabilities and characteristics of the resources mentioned, as stated in the’ RType box’in Figure A.1.

— Contact details of the resource.

— Details of the missions assigned including their names, status and relationship with the rest of the information.

— Details and description of the incident (3.1.6) input as free text by the responders (3.1.11).

ISO/TR 22351 [1] includes identifiers that are necessary for managing internally the relationships between the different concepts stated in the message but corresponds to information that is implicitly derived from the structure of the message sent, due to its hierarchical nature. This makes unnecessary to express them explicitly and therefore to define their meaning and for that reason they are not considered in this document.

A.3.3 Information included in OASIS EDXL-CAP

The information that is included in OASIS EXDL-CAP [6] messages and should therefore be excluded from the semantic layer is:

- Dates and times corresponding to the information transmitted.
- Geographical coordinates corresponding to the information transmitted.
- Identifiers: number or string (3.1.13) identifying:
  - The CAP alert message.
  - The originator-sender or recipient of the alert message.
  - The particular source of the alert message.
  - A reference to previous alert message(s).
  - The language of the alert message.
  - A full, absolute URI for an HTML page or other text resource with additional or reference information regarding the alert message.
  - A mimeType as speficied in [32] (formerly known as mimeTypes) and Media Subtypes as specified by the IANA [34]
  - A uri of a resource file.
- Status: takes enumerated code values for the type of CAP alert message: “Actual”, “Exercise”, “System”, “Test”, “Draft”.
- Resource: The container for all component parts of the resource sub-element of the info sub-element of the alert element:
  - resourceDesc: the human-readable text describing the type and content, such as “map” or “photo”, of the resource file.
  - mimeType, described previously under Identifier.
  - size: approximate size of the resource file in bytes; for<uri> based resources, <size> should be included if available.
  - uri as defined previously under Identifier.
  - Uri may be used either with or instead of the <uri> element in messages transmitted over one-way (e.g., broadcast) data links where retrieval of a resource via a URI is not feasible; and for other requirements from the specification published for EDXL-CAP v1.2 [6].

— Capabilities and characteristics of the four blocks of the CAP Message: <alert>, <info>, <resource> and <area> not specifically mentioned in this section.

— Incident(s): The group listing naming the referent incident(s) of the alert message.

— Category: a value from the list of categories in the EDXL-CAP v1.2 [6] specification.

— Event: The text denoting the type of the subject event of the alert message.

— Event Code: A system-specific code identifying the event type of the alert message in the form:

```
<eventCode>
  <valueName>valueName</valueName>
  <value>value</value>
</eventCode>
```

— Description: text describing the subject event of the alert message as free text by the responders (3.1.11).

The Event Code above became the genesis of the valueListUri/valueType mechanism adopted in later EDXL standards and specifications.

The EDXL family of standards groups the different terms that are related with any of the EDXL standards in the following categories:

— **CommonTypes** designated in use as the namespace abbreviation ct: for edxl-ct for use as such as EDXLDateTimeType, EDXLStringType, ValueListURIType, ValueType, etc as defined in the definition of the EDXL Common Types Specification [35]. These common types are designed to be able to use external namespaces defined in the valueListURIType that includes entries in the form of ValueTypes, which are entries that provide the name and value of the property to be reported. This allows EDXL-CAP to reference concepts that could not be included when defining the protocol through the inclusion of such concepts in external namespaces, which is precisely the approach of the semantic layer.

— **Contact Information** for a person or organization designated in use as the namespace abbreviation ciq: for edxl-ciq which is the Emergency Data Exchange Language (EDXL) Customer Information Quality (CIQ) Profile Version 1.0 [36].

— **Location Information** using datum WGS84 designated in use as the namespace abbreviation gsf: for edxl-gsf which is the Emergency Data Exchange Language (EDXL) GML Simple Features Profile Version 1.0 [37].

The first two of these supporting information sets contain references to source specifications, including component specifications. The third does not. The third is also consistent with the OGC, Open Geospatial Consortium, as used in this document. This is the EDXL Profile of the OGC Special Features Profile of GML.

While most OASIS Emergency Management Technical Committee's EDXL specifications make use of supporting specifications, OASIS EDXL-CAP v1.2 [6] and OASIS EDXL-DE v1.0 [9] do not.

With the exception of the external namespaces, the sets to be excluded from the semantic layer are:

— Taken from OASIS EDXL-CAP [6], and included in OASIS EDXL-SitRep [7], the element **urgency** is given a value from the enumerated list:

  — "Immediate" - Responsive action SHOULD be taken immediately.

  — "Expected" - Responsive action SHOULD be taken soon (within next hour).

  - "Future" - Responsive action SHOULD be taken in the near future.
  - "Past" - Responsive action is no longer required.
  - "Unknown" - Urgency not known
- Taken from OASIS EDXL-CAP [6], and included in OASIS EDXL-SitRep [7], the element **severity** is given a value from the enumerated list:
  - "Extreme" - Extraordinary threat to life or property.
  - "Severe" - Significant threat to life or property.
  - "Moderate" - Possible threat to life or property.
  - "Minor" – Minimal to no known threat to life or property.
  - "Unknown" - Severity unknown.
- Taken from OASIS EDXL-CAP [6], and not included in OASIS EDXL-SitRep [7], the element **certainty** is given a value from the enumerated list:
  - "Observed" – Determined to have occurred or to be ongoing.
  - "Likely" - Likely (p > ~50%).
  - "Possible" - Possible but not likely (p <= ~50%).
  - "Unlikely" - Not expected to occur (p ~ 0).
  - "Unknown" - Certainty unknown.
- Taken from OASIS EDXL-SitRep [7], the element **reportConfidence** is given a value from the enumerated list:
  - "HighlyConfident" – Topmost level of confidence.
  - "SomewhatConfident" – Medium level of confidence.
  - "Unsure" – Low level of confidence.
  - "NoConfidence" – Lack of confidence – Can be used to support cancellation of previous report.

There is another special case between OASIS EDXL-DE v1.0 [9] and OASIS EDXL-SitRep v1.0 [7].

This occurs with the distributionType element of OASIS EDXL-DE v1.0 [9] which takes one of the enumerated values:

- Response - A response to a previous request.
- Dispatch – A commitment of resources or assistance.
- Ack - Acknowledgment of receipt of an earlier message.
- Error - Rejection of an earlier message (for technical reasons).

— SensorConfiguration - These messages are for reporting configuration during power up or after Installation or maintenance.

— SensorControl - These are messages used to control sensors/sensor (3.1.12) concentrator components behavior.

— SensorStatus - These are concise messages which report sensors/sensor (3.1.12) concentrator component status or state of health.

— SensorDetection – These are high priority messages which report sensor (3.1.12) detections.

The following Figure A.2 provides the Element Reference Model excerpted from OASIS EDXL CAP v1.1. [6]

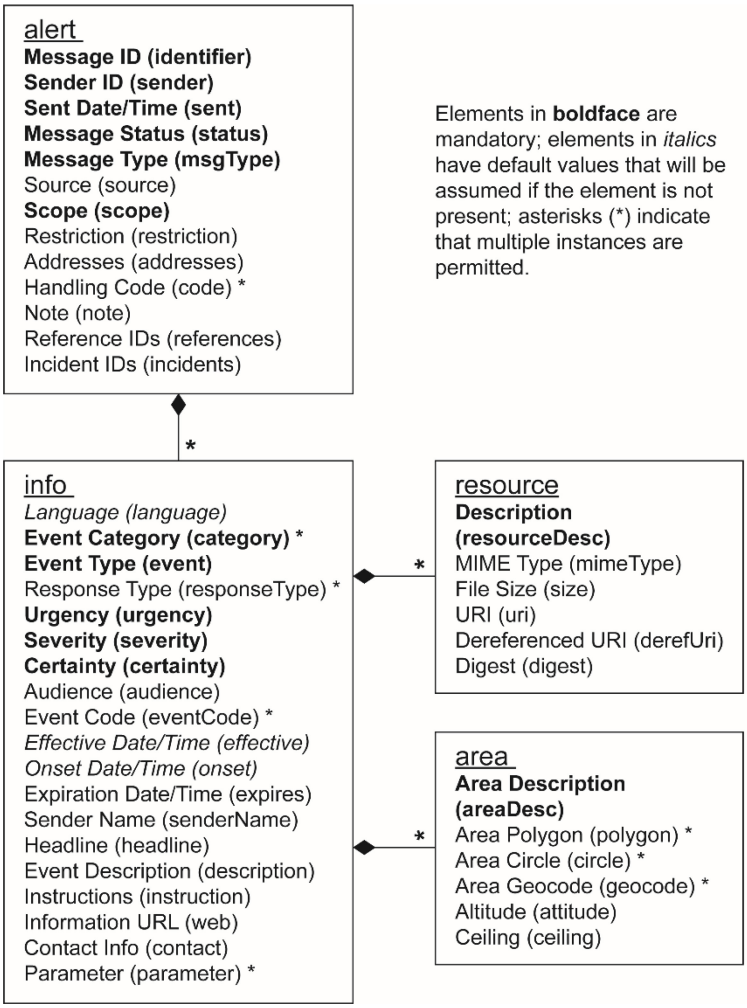

Figure A.2 — OASIS EDXL-CAP v1.2 [6] Element Reference Model (Based on Document Object Model circa 2004)

The following Figure A.3 from OASIS EDXL-CAP [6] shows the high-level structure of the elements that form the Element Reference Model.

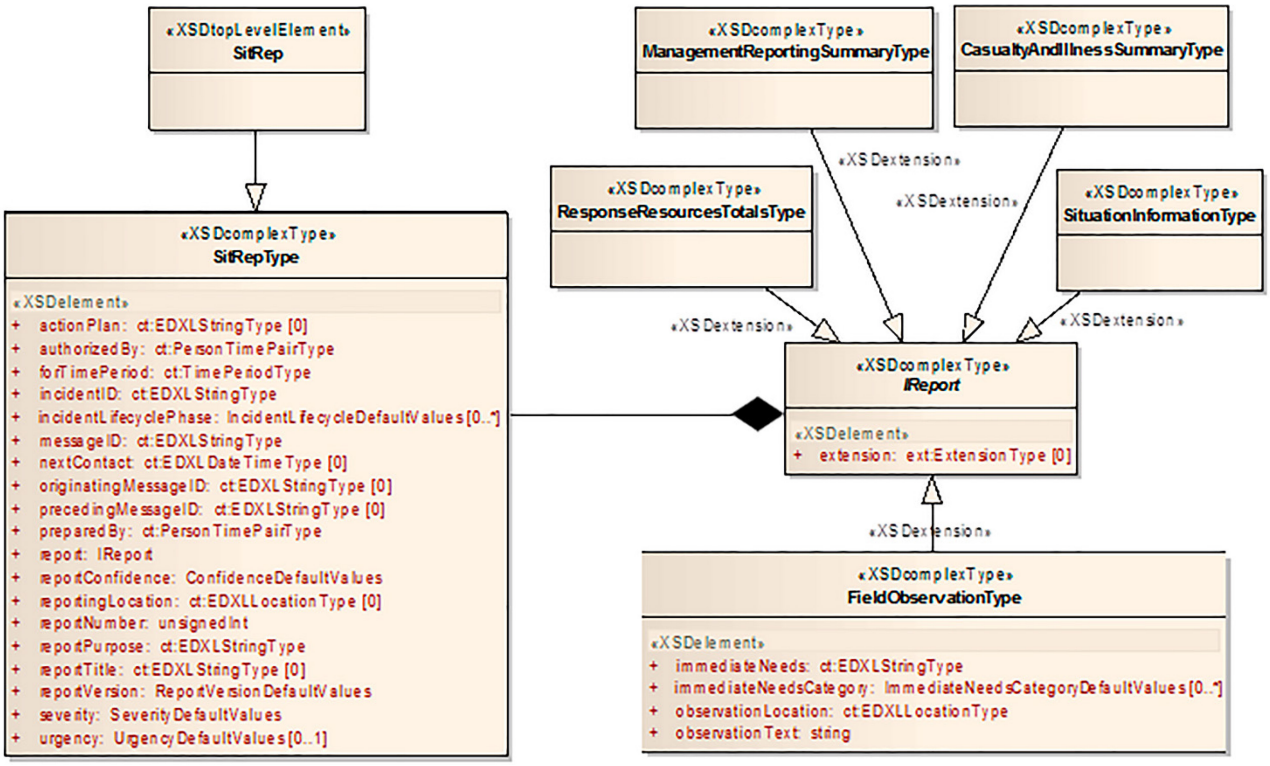

Figure A.3 — EDXL-SitRep v1.0 [7] Element Reference Model

A.3.4 Geographical referencing of data

Practically all standards for transmitting information in crisis management and from sensors (3.1.12) include specific fields for stating geographical positions in fixed fields and therefore there is no point in defining names for such fields whose meaning will be implicit in the definition of the standard.

A.3.5 Information included in OASIS EDXL-HAVE / HL7

An OASIS EDXL-HAVE (section 3.5, [10]) message contains information on:

— The organization that is responsible for the reporting facilities.

— Facility name and location.

— Overall facility status.

— Services.

— Operations.

— Resources.

— Staffing.

— Emergency department.

The overall facility status itself contains information on:

— Name of the facility.

— Kind of facility.

— ReportingPeriod.

— LastUpdate.

— OrganizationInformation.

— Status.

— Services.

— FutureServices.

— ActivityInPeriod.

— Operations.

— ResourceInformation.

— Staffing.

— EmergencyDepartment.

— TraumaCenter.

— Remarks.

Among those values, the kind of facility is defined to be one of the following values:

— Hospital.

— LongTermCare.

— UrgentCareClinic.

— TemporaryFacility.

— Other.

All these types of information are not included in the semantic layer accordingly.

NOTE The kind of facility differs from the facility type in 4.4.15. The kind of facility is designed to provide information on the capabilities and limitations of a clinical facility in terms of healthcare and treatment. It provides information that is specific to the clinical context. In contrast, facility type is a general term that is designed to provide information on the type or category of facility, but it is not designed to provide any information that is specific any context, including the clinical one. As such, both concepts complement each other, which is the reason why the facility type has not been removed from 4.4.15.

A.3.6 Information included in OASIS EDXL-TEP

OASIS EDXL-TEP [11] supports patient tracking across the Emergency Medical Services (EMS) care continuum. It also supports hospital evacuations and patient transfers. It is designed for providing real-time information to responders (3.1.11), Emergency Management, coordinating organizations and care facilities in the chain of care and transport.

A TEP message (section 3.6, [11]) contains a group of elements that describes the patient in terms of:

— Personal identifying information such as gender, race, date of birth, hair colour, etc.

— Communication / contact information such as spoken languages, family unification code.

— Special needs regarding transportation, medical attention, barriers to care, allergies.

— Situation information such as incident (3.1.6), location, time.

— Healthcare provider information such as kind, name, jurisdiction.

— Patient encounter information such as location, time, triage, care.

All these types of information are not included in the semantic layer accordingly.

A.3.7 Information included in OASIS EDXL-RM

OASIS EDXL-RM [12] defines a set of messages that can be exchanged between an entity asking for resources and an entity that can provide them. These messages follow a complex data structure that is shown in the Figure A.4. As such, the message structure contemplates the identifiers of the entities related with each part of the message, which are needed for establishing the relationship between the different entities to be included in the message.

Figure A.4 from the OASIS EDXL-RM [12] specification shows the high-level entities contemplated.

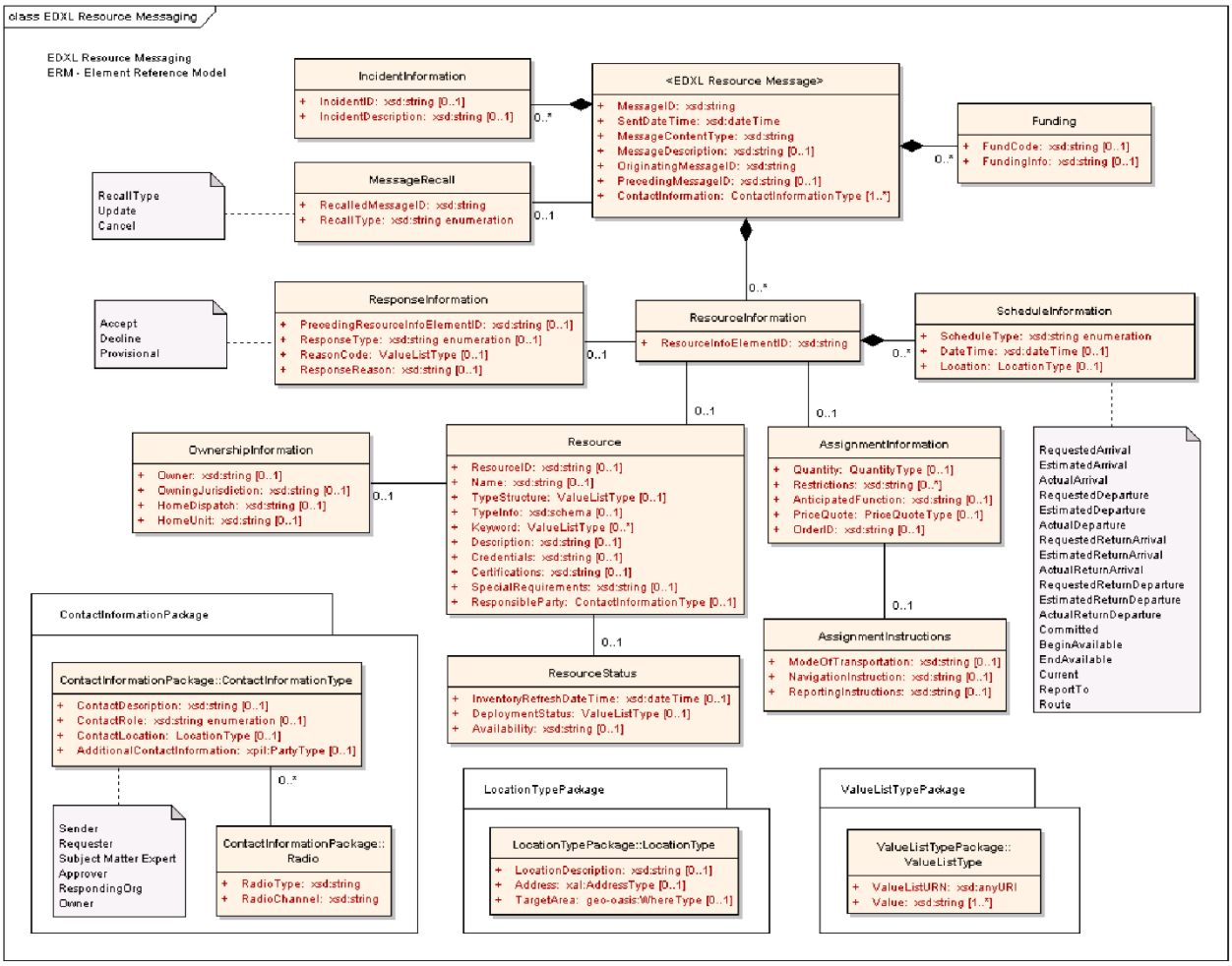

Figure A.4 — Class diagram for the entities contemplated in OASIS EDXL-RM [12]

The following is a list of concepts included in OASIS EDXL-RM [12] that are not included in the definition of the sematic layer:

— Recall Type: specifies whether a resource was recalled because of a cancel or update message.

— Fund Code: The funds that will pay for the resource.

— Funding info: Additional information on the funds that will pay for the resource.

— Type of response: can be either accept, decline or provisional.

— Response reason: Explanation for a declined or provisional response.

— Type of resource being requested.

— Description of the resource characteristics.

— List of credentials of a requester for authorization purposes.

— Special requirements for a resource.

— Certifications that recognize which special requirements the resource fulfils.

— Contact information for the person responsible for a resource.

— Owner of the resource.

— Owning jurisdiction of the resource.

— Name of the Resource home agency that dispatches the resource.

— Name of the unit that from which the resource works or is used.

— Date and time when resource inventory counts were last updated.

— Status of a resource request.

— Availability of resource, including possible limitations.

— Quantity of resources required.

— Restrictions on resources available.

— Anticipated function for the resource.

— Description of quoted cost to acquire a resource.

— Method of transportation.

— Navigation instructions that describe how to get to the destination.

— Reporting instructions that explain to whom or where the resource are expected to be reported upon arrival.

— Scheduled event related with the provision of the resource.

— Description of the contact associated with the resource.

— Role of the contact associated with the resource.

— Geographical location of the contact.

— Additional contact information.

— Contact radio type.

— Contact radio channel.

— Location description.

— Address in an internationally applicable format.

— Target area for the resource.

— Type of the target area.

— Name of a certified list maintained by a Community of Interest for the value referenced.

NOTE The concepts are listed here according to their meaning, instead of their exact name in the protocol to ease the reading. These concepts are referred to the management of resources and teams. They do not refer to similar topics out of this context.

Annex B
(informative)

OASIS EDXL-CAP fields for each type of information needed to be included in the alarms

This annex provides an explanation of how to include the information corresponding to the messages needed to support the operational needs stated in section 5.2 in an OASIS EDXL-CAP [6] message. It is a proof that OASIS EDXL-CAP [6] messages can contain such information. For more details on the structure see OASIS EDXL-CAP[6].

The list in Table B.1 is not exhaustive and only contains the fields that are conceptually essential to support each referenced functional need; OASIS EDXL-CAP [6] supports much more fields.

Table B.1 — Correspondence of operational needs with OASIS EDXL-CAP fields

Id	Operational need	Required field	OASIS EDXL-CAP fields
TA	Identification of the type of alert	Alert type	Info.Event text denoting the type of the subject event of the alert message combined with one of Info.Event Code or Info.Category
RAC	Reception of Alert from Citizens	Alert type	Info.Event Type Or info.EventCode
		Type of incident	Info.Category a code indicating the type of incident, such as 'CBRNE, 'fire', etc. See OASIS EDXL-CAP [6] specification for full list of values
		Alert description	Info.Event Description
		location	Info.area.Area polygon for the location coordinates
			Infor.area.Area Description for an optional description of the location
RAS	Automatic reception of alerts generated by sensors	Alert type	Info.Event Type
		Sensor data	Info.parameter containing the message from the sensor, which may comply to any sensor standard. However, there is no predefined name in OASIS EDXL-CAP [6] for this field. We suggest using the name for Sensor message included in the Semantic layer

Id	Operational need	Required field	OASIS EDXL-CAP fields
		Alert location	Info.area information that will specify at least a polygon corresponding to the geographical position of the sensor
RDU	Issuing requests to dispatch units	Type of request / command	Info.instructions
		Type of action recommended (OPTIONAL)	Info.Response Type any of the action types included in the list specified in OASIS EDXL-CAP [6] specification as per indicated in info.instructions
		location	Info.area.Area Polygon for the location coordinates
			Infor.area.Area Description for an optional description of the location
IKT	Identification of known terrorists	Alert type	Info.Event Type with an explanation of a terrorist being identified
		File/video with the identification	Info.resource.uri for an uri containing the content with the image or video of the identification
		Explanation of the identification of the subject and his level of match	Info.resource.description set to contain such explanation and the percentage of match of the identified subject with the provided file/video
DR	Detection Reliability	Certainty level	Info.certainty.code A certainty code corresponding to any of the five possible values stated in OASIS EDXL-CAP [6] definition
		Type of incident	Category a code indicating the type of incident, such as ‘CBRNE, ‘fire’, etc. See OASIS EDXL-CAP [6] specification for full list of values

Annex C
(informative)

OASIS EDXL-SitRep fields for each kind of needed report

This annex provides an explanation of how to include the information corresponding to the reports needed to support the operational needs in 5.2 in an OASIS EDXL-SitRep [7] messages. It is a proof that OASIS EDXL-SitRep [7] messages can contain such information. For more details on the structure of a report see [7].

Table C.1 — Correspondence of operational needs with OASIS EDXL-SitRep fields

Id	Operational need	Required field	OASIS EDXL-SitRep fields
LC	List of commands issued	Destination location of the command	reportToLocation: ct:EDXLLocationType
		Work assigned	workAssignment: ct:EDXLStringType
		Special instructions	specialInstructions: xs:string
		Units to be assigned	organizationAndAssignments
MS	Mission status: general fields	Action type	EDXL-SitRep ManagementReportingSummary: Situation Summary:
		Resource affected	ResponseResouresTotalsReportType:Resource Information: ResourceDetailType:
		Count of personnel assigned	resourcePersonnelCount: xs:unsignedInt
		Personnel unassigned	unassignedResourcePersonnel: xs:unsignedInt
		Number of resources required	resourceRequiredCount: xs:unsignedInt
		Number of resources committed	resourceCommittedCount: xs:unsignedInt
		Count of resources on hand	resourceOnHandCount: xs:unsignedInt
		Count of resources still needed	resourceStillNeededCount: xs:unsignedInt
		Count of resources requested	resourceRequestedCount: xs:unsignedInt
		Date and time of the order	dateTimeOrdered: ct:EDXLDateTimeType
		Date and time requested for the arrival	requestedArrival: ct:EDXLDateTimeType
		Estimated date and time of arrival	estimatedArrival: ct:EDXLDateTimeType
		Location to Report to	reportToLocation: ct:EDXLLocationType
		Overhead position	overheadPosition: ct:ValueKeyIntPairType
		Work / mission assigned	workAssignment: ct:EDXLStringType
		Special instructions to be added to the mission	specialInstructions: xs:string
		Special equipment and supplies to be assigned to the mission	specialEquipmentAndSupplies: xs:string

Id	Operational need	Required field	OASIS EDXL-SitRep fields
		Additional organizations assigned to the mission	additionalAssistingOrganizations: xs:string
		Status of a resource	resourceStatus: ResourceStatusType
	Mission status: status types	Acknowledgement to order	A SitRep message in response with the field DistributionType to Ack, which means acknowledgement to a previous message
		Execution in progress	There are several fields to state the status of an action, but they depend on the type of situational report. That is, they can be used for those types of actions that match that type of record, but there is not any general field for this
		Order executed	The message is embedded in an OASIS EDXL-DE message that includes the identifier of the original message that is being responded. It is possible for any software receiving the reply to go back to the original message from that identifier and collect the details of the request, including the type of request.
		Unable to comply	Distribution type set to Update. The software receiving the reply needs to infer this from the content of the reply.
		Rejected	Distribution type set to Error, which means - Rejection of an earlier message (for technical reasons).
WR	Weather report	Area affected	weatherEffects [0..1]: ct:WeatherInfoType
		Effects window	weatherEffects [0..1]: ct:WeatherInfoType Definition:Text indicating **current and predicted weather** and related factors that may affect or cause concern for the incident and related areas, in the form of a short synopsis on weather factors.
		Weather effects	SitRep: **ManagementReportingSummary** Report Type weatherEffects [0..1]: ct:WeatherInfoType
PAP	List of potentially affected populations See (generalPopulationStatus) below for specification of generalPopulationStatus	The list of specific fields will depend on each type of specific report	SitRep; **CasualtyAndIllnessSummary** Report Type: Complex Type: **NotifiableDiseaseNumbers**: Sub-element: countOfSuspectedCases countOfSuspectedCases

Id	Operational need	Required field	OASIS EDXL-SitRep fields
	General status description of the general population in designated counties during emergencies or disasters	General population status, including population name, their geographical location and status	**SituationSummaryType: generalPopulationStatus** **jurisdictionInformation** (closestSitRep element for the population name and geographical location. The incident name with the geographical boundaries of jurisdiction(s) involved (county or counties affected) taken together describe and define a population name
CAT	fields corresponding to the CBRN agent type	Agent type (note that this field can also be used for natural hazards)	**IncidentInformationType**: incidentKind, **SituationSummaryType**: incidentCause
		Jurisdiction authority	JurisdictionInformation: **Reference to a legal governmental organization or agency that has "Authority" over some geographically defined area, population and resources in response to an emergency or crisis** (such as an incident, or a set of identified resources). Jurisdiction in this sense may be general, such as "federal", "city", or "state", or may be specific agency names such as "Warren County", "US Coast Guard", "Panama City", and "NYPD".
		Known usages (optional)	No field in SitRep for this
CR	Clinical report with a list of all patients assigned to hospitals		Response Resources Summary Report. SitRep: **CasualtyAndIllnessSummary** Report Type: Complex Type: **Summary Count Type**: Sub-element: nonResponderSummaryCount
CI	Summary clinical report of the crisis	Total Number of fatalities	NumberOfFatalities
		Total number of hospitalized people	NumberOfHospitalized
		Number of injured / ill people	NumberOfWithInjury/Illness
		Number of people in need of rescue	NumberOfTrapped/In need of rescue
		Number of missing people	NumberOfMissing
		Number of evacuated people	NumberOfEvacuated
		Number of sheltered in place people	NumberOfSheltering In Place
		Number of people in temporary shelters	NumberInTemporaryShelters
		Number of people in quarantine	NumberInQuarantine
		Number of people that have received mass immunization	HaveReceivedMassImmunizationsCount
		Number of people pending for mass immunization	RequireMassImmunizationsCount

Annex D
(normative)

Full semantic layer

D.1 URNs for the field names

urn:SSLy:General:Plane_angle

urn:SSLy:General:Solid_angle

urn:SSLy:General:Frequency

urn:SSLy:General:Activity_radionuclide

urn:SSLy:General:Absorbed_dose

urn:SSLy:General:Close_equivalent

urn:SSLy:General:Catalytic_activity

urn:SSLy:General:Force

urn:SSLy:General:Pressure

urn:SSLy:General:Power

urn:SSLy:General:Energy

urn:SSLy:General:Celsius_temperature

urn:SSLy:General:Electric_charge

urn:SSLy:General:Magnetic_flux

urn:SSLy:General:Magnetic_flux_density

urn:SSLy:General:Capacitance

urn:SSLy:General:Luminous_flux

urn:SSLy:General:Illuminance

urn:SSLy:Space_time:Length

urn:SSLy:Space_time:Width

urn:SSLy:Space_time:Height

urn:SSLy:Space_time:Diameter

urn:SSLy:Space_time:Radius

urn:SSLy:Space_time:Path_length

urn:SSLy:Space_time:Distance

urn:SSLy:Space_time:Radial_distance

urn:SSLy:Space_time:Position_vector

urn:SSLy:Space_time:Displacement

urn:SSLy:Space_time:Curvature

urn:SSLy:Space_time:Area

urn:SSLy:Space_time:Volume
urn:SSLy:Space_time:Angular_measure
urn:SSLy:Space_time:Rotational_displacement
urn:SSLy:Space_time:Angular_displacement
urn:SSLy:Space_time:Phase_angle:
urn:SSLy:Space_time:Solid_angular_measure
urn:SSLy:Space_time:Duration
urn:SSLy:Space_time:Velocity
urn:SSLy:Space_time:Speed
urn:SSLy:Space_time:Acceleration
urn:SSLy:Space_time:Angular_velocity
urn:SSLy:Space_time:Angular_acceleration
urn:SSLy:Space_time:Period_duration,_period
urn:SSLy:Space_time:Time_constant
urn:SSLy:Space_time:Rotation
urn:SSLy:Space_time:Rotation_frequency
urn:SSLy:Space_time:Rotational_frequency
urn:SSLy:Space_time:Angular_frequency
urn:SSLy:Space_time:Wavelength
urn:SSLy:Space_time:Repetency
urn:SSLy:Space_time:Wavenumber
urn:SSLy:Space_time:Wave_vector
urn:SSLy:Space_time:Angular_repetency
urn:SSLy:Space_time:Angular_wavenumber
urn:SSLy:Space_time:Phase_velocity
urn:SSLy:Space_time:Phase_speed
urn:SSLy:Space_time:Group_velocity
urn:SSLy:Space_time:Group_speed
urn:SSLy:Space_time:Damping_coefficient
urn:SSLy:Space_time:Logarithmic_decrement
urn:SSLy:Space_time:Attenuation
urn:SSLy:Space_time:Extinction
urn:SSLy:Space_time:Phase_coefficient
urn:SSLy:Space_time:Propagation_coefficient
urn:SSLy:Mechanics:Mass
urn:SSLy:Mechanics:Density

urn:SSLy:Mechanics:Mass_density
urn:SSLy:Mechanics:Specific_Volume
urn:SSLy:Mechanics:Relative_density
urn:SSLy:Mechanics:Specific_volume
urn:SSLy:Mechanics:Relative_density
urn:SSLy:Mechanics:Relative_mass_density
urn:SSLy:Mechanics:Surface_density
urn:SSLy:Mechanics:Surface_mass_density
urn:SSLy:Mechanics:Linear_density
urn:SSLy:Mechanics:Linear_mass_density
urn:SSLy:Mechanics:Moment_inertia
urn:SSLy:Mechanics:Momentum
urn:SSLy:Mechanics:Weight
urn:SSLy:Mechanics:Static_friction
urn:SSLy:Mechanics:Kinetic_friction
urn:SSLy:Mechanics:Dynamic_friction_force
urn:SSLy:Mechanics:Rolling_resistance
urn:SSLy:Mechanics:Rolling_drag
urn:SSLy:Mechanics:Rolling_friction_mode
urn:SSLy:Mechanics:Drag_force
urn:SSLy:Mechanics:Impulse
urn:SSLy:Mechanics:Angular_momentum
urn:SSLy:Mechanics:Torque
urn:SSLy:Mechanics:Angular_impulse
urn:SSLy:Mechanics:Gauge_pressure
urn:SSLy:Mechanics:Normal_stress
urn:SSLy:Mechanics:Shear_stress
urn:SSLy:Mechanics:Strain
urn:SSLy:Mechanics:Relative_linear_strain
urn:SSLy:Mechanics:Shear_strain
urn:SSLy:Mechanics:Relative_volume_strain
urn:SSLy:Mechanics:Poisson_number
urn:SSLy:Mechanics:Modulus_elasticity
urn:SSLy:Mechanics:Modulus_compression
urn:SSLy:Mechanics:Compressibility
urn:SSLy:Mechanics:Second_axial_moment_area

urn:SSLy:Mechanics:Second_polar_moment_area
urn:SSLy:Mechanics:Section_modulus
urn:SSLy:Mechanics:Static_friction_coefficient
urn:SSLy:Mechanics:Kinetic_friction_factor
urn:SSLy:Mechanics:Rolling_resistance_factor
urn:SSLy:Mechanics:Drag_factor
urn:SSLy:Mechanics:Viscosity
urn:SSLy:Mechanics:Kinematic_viscosity
urn:SSLy:Mechanics:Surface_tension
urn:SSLy:Mechanics:Potential_energy
urn:SSLy:Mechanics:Kinetic_energy
urn:SSLy:Mechanics:Mechanical_energy
urn:SSLy:Mechanics:Work,_mechanical_work
urn:SSLy:Mechanics:Efficiency
urn:SSLy:Mechanics:Mass_flow
urn:SSLy:Mechanics:Mass_flow_rate
urn:SSLy:Mechanics:Mass_change_rate
urn:SSLy:Mechanics:Volume_flow_rate
urn:SSLy:Mechanics:Action
urn:SSLy:Thermodynamics:Temperature
urn:SSLy:Thermodynamics:Linear_expansion_coefficient
urn:SSLy:Thermodynamics:Cubic_expansion_coefficient
urn:SSLy:Thermodynamics:Relative_expansion_coefficient
urn:SSLy:Thermodynamics:Relative_pressure_coefficient
urn:SSLy:Thermodynamics:Pressure_coefficient
urn:SSLy:Thermodynamics:Isothermal_compressibility
urn:SSLy:Thermodynamics:Isentropic_compressibility
urn:SSLy:Thermodynamics:Heat
urn:SSLy:Thermodynamics:Latent_heat
urn:SSLy:Thermodynamics:Heat_flow_rate
urn:SSLy:Thermodynamics:Density_heat_flow_rate
urn:SSLy:Thermodynamics:Thermal_conductivity
urn:SSLy:Thermodynamics:Coefficient_heat_transfer
urn:SSLy:Thermodynamics:Surface_coefficient_heat_transfer
urn:SSLy:Thermodynamics:Thermal_insulance
urn:SSLy:Thermodynamics:Thermal_resistance

urn:SSLy:Thermodynamics:Thermal_conductance
urn:SSLy:Thermodynamics:Thermal_diffusivity
urn:SSLy:Thermodynamics:Heat_capacity
urn:SSLy:Thermodynamics:Specific_heat_capacity_at_constant_pressure
urn:SSLy:Thermodynamics:Specific_heat_capacity_at_constant_volume
urn:SSLy:Thermodynamics:Specific_heat_capacity_at_saturated_vapour_pressure
urn:SSLy:Thermodynamics:Ratio_specific_heat_capacities
urn:SSLy:Thermodynamics:Isentropic_exponent
urn:SSLy:Thermodynamics:Entropy
urn:SSLy:Thermodynamics:Specific_entropy
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urn:SSLy:Thermodynamics:Enthalpy
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urn:SSLy:Thermodynamics:Specific_Gibbs_function
urn:SSLy:Thermodynamics:Massieu_function
urn:SSLy:Thermodynamics:Planck_function
urn:SSLy:Thermodynamics:Joule-Thomson_coefficient
urn:SSLy:Thermodynamics:Thermodynamic_Efficiency
urn:SSLy:Thermodynamics:Maximum_efficiency
urn:SSLy:Thermodynamics:Specific_gas_constant
urn:SSLy:Thermodynamics:Mass_concentration_water
urn:SSLy:Thermodynamics:Mass_concentration_water_vapour
urn:SSLy:Thermodynamics:Mass_ratio_water_to_dry_matter
urn:SSLy:Thermodynamics:Mass_ratio_water_vapour_to_dry_gas
urn:SSLy:Thermodynamics:Mass_fraction_water
urn:SSLy:Thermodynamics:Mass_fraction_dry_matter
urn:SSLy:Thermodynamics:Relative_humidity
urn:SSLy:Thermodynamics:Relative_mass_concentration_vapour
urn:SSLy:Thermodynamics:Relative_mass_ratio_vapour
urn:SSLy:Thermodynamics:Dew-point_temperature

urn:SSLy:Electromagnetism:Electric current
urn:SSLy:Electromagnetism:Elementary_charge
urn:SSLy:Electromagnetism:Electric_charge_density
urn:SSLy:Electromagnetism:Surface_density_electric_charge
urn:SSLy:Electromagnetism:Linear_density_electric_charge
urn:SSLy:Electromagnetism:Electric_dipole_moment
urn:SSLy:Electromagnetism:Electric_polarization
urn:SSLy:Electromagnetism:Electric_current_density
urn:SSLy:Electromagnetism:Linear_electric_current_density
urn:SSLy:Electromagnetism:Electric_field_strength
urn:SSLy:Electromagnetism:Electric_potential
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urn:SSLy:Electromagnetism:Voltage
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urn:SSLy:Electromagnetism:Electric_flux_density
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urn:SSLy:Electromagnetism:Coercivity
urn:SSLy:Electromagnetism:Magnetic_vector_potential

urn:SSLy:Electromagnetism:Electromagnetic-energy_density
urn:SSLy:Electromagnetism:Pointing_vector
urn:SSLy:Electromagnetism:Phase_speed_electromagnetic_waves
urn:SSLy:Electromagnetism:Source_voltage
urn:SSLy:Electromagnetism:Scalar_magnetic_potential
urn:SSLy:Electromagnetism:Magnetic_tension
urn:SSLy:Electromagnetism:Magnetomotive_force
urn:SSLy:Electromagnetism:Current_linkage
urn:SSLy:Electromagnetism:Number_turns_is_winding
urn:SSLy:Electromagnetism:Reluctance
urn:SSLy:Electromagnetism:Permeance
urn:SSLy:Electromagnetism:Inductance
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urn:SSLy:Electromagnetism:Conductivity
urn:SSLy:Electromagnetism:Resistivity
urn:SSLy:Electromagnetism:instantaneous_power
urn:SSLy:Electromagnetism:Resistance
urn:SSLy:Electromagnetism:Conductance
urn:SSLy:Electromagnetism:Phase_difference
urn:SSLy:Electromagnetism:Electric_current_phasor
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urn:SSLy:Electromagnetism:Reactive_power
urn:SSLy:Electromagnetism:Non-active_power
urn:SSLy:Electromagnetism:Active_energy
urn:SSLy:Light:Speed_light_in_medium
urn:SSLy:Light:Refractive_index
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urn:SSLy:Light:Radiance
urn:SSLy:Light:Spectral_radiance
urn:SSLy:Light:Irradiance
urn:SSLy:Light:Spectral_irradiance
urn:SSLy:Light:Radiant_exitance_(deprecated)
urn:SSLy:Light:Spectral_radial_exitance
urn:SSLy:Light:Radiant_exposure
urn:SSLy:Light:Spectral_radiant_exposure
urn:SSLy:Light:Luminous_efficiency
urn:SSLy:Light:Spectral_luminous_efficiency
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urn:SSLy:Light:Maximum_luminous_efficacy
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urn:SSLy:Light:Mass_absorption_coefficient

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urn:SSLy:Acoustics:Logarithmic_frequency_rate
urn:SSLy:Acoustics:Static_pressure
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urn:SSLy:Acoustics:Sound_particle_displacement
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urn:SSLy:Phys_chem_mol_phys:Extent_reaction
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urn:SSLy:Atomic_nuclear_phys:Neutron_number
urn:SSLy:Atomic_nuclear_phys:Nucleon_number
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urn:SSLy:Atomic_nuclear_phys:Rest_energy
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urn:SSLy:Atomic_nuclear_phys:Magnetic_quantum_number

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urn:SSLy:Atomic_nuclear_phys:Resonance_energy

urn:SSLy:Atomic_nuclear_phys:Cross_section
urn:SSLy:Atomic_nuclear_phys:Total_cross_section
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urn:SSLy:Atomic_nuclear_phys:Total_ionization
urn:SSLy:Atomic_nuclear_phys:Average_energy_loss_per_elementary_charge_produced
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urn:SSLy:Atomic_nuclear_phys:Particle_number_density
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urn:SSLy:Atomic_nuclear_phys:Diffusion_coefficient_for_fluence_rate
urn:SSLy:Atomic_nuclear_phys:Particle_source_density
urn:SSLy:Atomic_nuclear_phys:Slowing-down_density
urn:SSLy:Atomic_nuclear_phys:Resonance_escape_probability
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urn:SSLy:Atomic_nuclear_phys:Average_logarithmic_energy_decrement

urn:SSLy:Atomic_nuclear_phys:Mean_free_path
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urn:SSLy:Characteristic_numbers:Euler_number
urn:SSLy:Characteristic_numbers:Froude_number
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urn:SSLy:Characteristic_numbers:Stokes_number_drag
urn:SSLy:Characteristic_numbers:Laplace_number
urn:SSLy:Characteristic_numbers:Blake_number
urn:SSLy:Characteristic_numbers:Sommerfeld_number
urn:SSLy:Characteristic_numbers:Taylor_number_momentum_transfer
urn:SSLy:Characteristic_numbers:Galilei_number
urn:SSLy:Characteristic_numbers:Womersley_number
urn:SSLy:Characteristic_numbers:Fourier_number
urn:SSLy:Characteristic_numbers:Péclet_number
urn:SSLy:Characteristic_numbers:Rayleigh_number
urn:SSLy:Characteristic_numbers:Froude_number

urn:SSLy:Characteristic_numbers:Nusselt_number
urn:SSLy:Characteristic_numbers:Blot_number
urn:SSLy:Characteristic_numbers:Stanton_number
urn:SSLy:Characteristic_numbers:J-factor
urn:SSLy:Characteristic_numbers:Bejan_number_heat_transfer
urn:SSLy:Characteristic_numbers:Bejan_number_entropy
urn:SSLy:Characteristic_numbers:Stefan_number
urn:SSLy:Characteristic_numbers:Brinkman_number
urn:SSLy:Characteristic_numbers:Clausius_number
urn:SSLy:Characteristic_numbers:Carnot_number
urn:SSLy:Characteristic_numbers:Eckert_number
urn:SSLy:Characteristic_numbers:Graetz_number
urn:SSLy:Characteristic_numbers:Heat_transfer_number
urn:SSLy:Characteristic_numbers:Pomerantsev_number
urn:SSLy:Characteristic_numbers:Boltzmann_number
urn:SSLy:Characteristic_numbers:Stark_number
urn:SSLy:Condensed_matter_phys:Lattice_vector
urn:SSLy:Condensed_matter_phys:Fundamental_lattice_vectors
urn:SSLy:Condensed_matter_phys:Angular_reciprocal_lattice_vector
urn:SSLy:Condensed_matter_phys:Fundamental_reciprocal_lattice_vectors
urn:SSLy:Condensed_matter_phys:Lattice_plane_spacing
urn:SSLy:Condensed_matter_phys:Bragg_angle
urn:SSLy:Condensed_matter_phys:Short-range_order_parameter
urn:SSLy:Condensed_matter_phys:Long-range_order_parameter
urn:SSLy:Condensed_matter_phys:Atomic_scattering_factor
urn:SSLy:Condensed_matter_phys:Structure_factor
urn:SSLy:Condensed_matter_phys:Burgers_vector
urn:SSLy:Condensed_matter_phys:Particle_position_vector
urn:SSLy:Condensed_matter_phys:Equilibrium_position_vector
urn:SSLy:Condensed_matter_phys:Displacement_vector
urn:SSLy:Condensed_matter_phys:Debye-Waller_factor
urn:SSLy:Condensed_matter_phys:Angular_wavenumber
urn:SSLy:Condensed_matter_phys:Fermi_angular_wavenumber
urn:SSLy:Condensed_matter_phys:Debye_angular_wavenumber
urn:SSLy:Condensed_matter_phys:Debye_angular_frequency
urn:SSLy:Condensed_matter_phys:Debye_temperature

urn:SSLy:Condensed_matter_phys:Density_vibration_states
urn:SSLy:Condensed_matter_phys:Thermodynamic_Grüneisen_parameter
urn:SSLy:Condensed_matter_phys:Grüneisen_parameter
urn:SSLy:Condensed_matter_phys:Mean_free_path_photons
urn:SSLy:Condensed_matter_phys:Mean_free_path_electrons
urn:SSLy:Condensed_matter_phys:Energy_density_states
urn:SSLy:Condensed_matter_phys:Residual_resistivity
urn:SSLy:Condensed_matter_phys:Lorenz_coefficient
urn:SSLy:Condensed_matter_phys:Hall_coefficient
urn:SSLy:Condensed_matter_phys:Thermoelectric_voltage
urn:SSLy:Condensed_matter_phys:Seebeck_coefficient
urn:SSLy:Condensed_matter_phys:Peltier_coefficient
urn:SSLy:Condensed_matter_phys:Thomson_coefficient
urn:SSLy:Condensed_matter_phys:Work_function
urn:SSLy:Condensed_matter_phys:Ionization_energy
urn:SSLy:Condensed_matter_phys:Electron_affinity
urn:SSLy:Condensed_matter_phys:Richardson_constant
urn:SSLy:Condensed_matter_phys:Fermy_energy
urn:SSLy:Condensed_matter_phys:Gap_energy
urn:SSLy:Condensed_matter_phys:Fermi_temperature
urn:SSLy:Condensed_matter_phys:Electron_density
urn:SSLy:Condensed_matter_phys:Hole_density
urn:SSLy:Condensed_matter_phys:Intrinsic_carrier_density
urn:SSLy:Condensed_matter_phys:Donor_density
urn:SSLy:Condensed_matter_phys:Acceptor_density
urn:SSLy:Condensed_matter_phys:Effective_mass
urn:SSLy:Condensed_matter_phys:Mobility_ratio
urn:SSLy:Condensed_matter_phys:Relaxation_time
urn:SSLy:Condensed_matter_phys:Carrier_lifetime
urn:SSLy:Condensed_matter_phys:Diffusion_length
urn:SSLy:Condensed_matter_phys:Exchange_integral
urn:SSLy:Condensed_matter_phys:Curie_temperature
urn:SSLy:Condensed_matter_phys:Néel_temperature
urn:SSLy:Condensed_matter_phys:Superconductor_transition_temperature
urn:SSLy:Condensed_matter_phys:Thermodynamic_critical_magnetic_flux_density
urn:SSLy:Condensed_matter_phys:Lower_critical_magnetic_flux_density

urn:SSLy:Condensed_matter_phys:Upper_critical_magnetic_flux_density
urn:SSLy:Condensed_matter_phys:Superconductor_energy_gap
urn:SSLy:Condensed_matter_phys:London_penetration_gap
urn:SSLy:Condensed_matter_phys:Coherence_length
urn:SSLy:info_science_tech:Traffic_intensity
urn:SSLy:info_science_tech:Traffic_offered_intensity
urn:SSLy:info_science_tech:traffic load
urn:SSLy:info_science_tech:Mean_queue_length
urn:SSLy:info_science_tech:Loss_probability
urn:SSLy:info_science_tech:Waiting_probability
urn:SSLy:info_science_tech:Call_intensity
urn:SSLy:info_science_tech:Completed_call_intensity
urn:SSLy:info_science_tech:Storage_capacity
urn:SSLy:info_science_tech:Equivalent_binary_storage_capacity
urn:SSLy:info_science_tech:Transfer_rate
urn:SSLy:info_science_tech:Period_data_elements
urn:SSLy:info_science_tech:bit_rate
urn:SSLy:info_science_tech:bit_period
urn:SSLy:info_science_tech:equivalent_bit_rate
urn:SSLy:info_science_tech:Modulation_rate
urn:SSLy:info_science_tech:Quantizing_distortion_power
urn:SSLy:info_science_tech:Carrier_power
urn:SSLy:info_science_tech:Signal_energy_per_binary_digit
urn:SSLy:info_science_tech:Error_probability
urn:SSLy:info_science_tech:Hamming_distance
urn:SSLy:info_science_tech:Clock_frequency
urn:SSLy:info_science_tech:Decision_content
urn:SSLy:info_science_tech:Information_content
urn:SSLy:info_science_tech:Information_entropy
urn:SSLy:info_science_tech:Maximum_entropy
urn:SSLy:info_science_tech:Relative_entropy
urn:SSLy:info_science_tech:Redundancy
urn:SSLy:info_science_tech:Relative_redundancy
urn:SSLy:info_science_tech:Joint_information_content
urn:SSLy:info_science_tech:Conditional_information_content
urn:SSLy:info_science_tech:Conditional_entropy

urn:SSLy:info_science_tech:Equivocation
urn:SSLy:info_science_tech:Irrelevance
urn:SSLy:info_science_tech:Transinformation_content
urn:SSLy:info_science_tech:Mean_transinformation_content
urn:SSLy:info_science_tech:Character_mean_entropy
urn:SSLy:info_science_tech:Average_information_rate
urn:SSLy:info_science_tech:Character_mean_transinformation_content
urn:SSLy:info_science_tech:Average_transinformation_rate
urn:SSLy:info_science_tech:Channel_capacity_per_character
urn:SSLy:info_science_tech:Channel_time_capacity
urn:SSLy:monitoring:Operational_status
urn:SSLy:monitoring:Status_not_started
urn:SSLy:monitoring:Status_stopped
urn:SSLy:monitoring:Status_active
urn:SSLy:monitoring:Status_disrupted
urn:SSLy:monitoring:Status_disabled
urn:SSLy:monitoring:Status_enabled
urn:SSLy:monitoring:Status_malfunctioning
urn:SSLy:monitoring:Device_work_status
urn:SSLy:monitoring:Device_status_able_to_work
urn:SSLy:monitoring:Device_Status_malfunctioning
urn:SSLy:monitoring:Device_status_unable_to_work
urn:SSLy:monitoring:Cause
urn:SSLy:monitoring:Trust_status
urn:SSLy:monitoring:Trust_status_pending_approval
urn:SSLy:monitoring:Trust_status_approved
urn:SSLy:monitoring:Trust_status_untrusted
urn:SSLy:monitoring:Trust_status_unreliable
urn:SSLy:monitoring:Trust_status_compromised
urn:SSLy:monitoring:Alarm
urn:SSLy:monitoring:Origin_data_type
urn:SSLy:monitoring:Origin_type_actual
urn:SSLy:monitoring:Origin_type_predicted
urn:SSLy:monitoring:Origin_data_simulated
urn:SSLy:monitoring:Warning threshold
urn:SSLy:monitoring:Alarm Threshold

urn:SSLy:facilities:Facility_type
urn:SSLy:facilities:Facility_type_Hotel
urn:SSLy:facilities:Facility_type_Shelter
urn:SSLy:facilities:Facility_type_Hospital
urn:SSLy:facilities:Facility_type_Clinic
urn:SSLy:facilities:Facility_type_Theater
urn:SSLy:facilities:Facility_type_Stadium
urn:SSLy:facilities:Facility_type_Warehouse
urn:SSLy:facilities:Facility_type_Police_Station
urn:SSLy:facilities:Facility_type_Firefighter_Station
urn:SSLy:facilities:Facility_type_Military_quarters
urn:SSLy:facilities:Facility_type_Electric_Power_Plant
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Wind_Turbine
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Photovoltaic
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Gas Plant
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Fuel Plant
urn:SSLy:facilities:Facility_type_Oil_Refinery
urn:SSLy:facilities:Facility_type_Oil_Store
urn:SSLy:facilities:Facility_type_Transmissions_Towe
urn:SSLy:facilities:Facility_type_Electricity_Transport_Line
urn:SSLy:facilities:Facility_type_Oil_Pipeline
urn:SSLy:facilities:Facility_type_Gas_Pipeline
urn:SSLy:facilities:Facility_type_Inland_Waterways
urn:SSLy:facilities:Facility_type_Water_Processing_Plant
urn:SSLy:facilities:Facility_type_Deaslination_Plant
urn:SSLy:facilities:Facility_type_Dam
urn:SSLy:facilities:Facility_type_Care_Home
urn:SSLy:facilities:Facility_type_School
urn:SSLy:facilities:Facility_type_Prison
urn:SSLy:facilities:Facility_type_Young_Offenders_Institute
urn:SSLy:facilities:Facility_type_Orphanage
urn:SSLy:facilities:Facility_type_Road
urn:SSLy:facilities:Facility_type_Road/Highway
urn:SSLy:facilities:Facility_type_Train_Station
urn:SSLy:facilities:Facility_type_Airport
urn:SSLy:facilities:Facility_type_Bridge

urn:SSLy:facilities:Total_Capacity
urn:SSLy:facilities:Total_Capacity_Units
urn:SSLy:facilities:Current_availability
urn:SSLy:facilities:Operational_status
urn:SSLy:facilities:Operational_status_Decomissioned
urn:SSLy:facilities:Operational_status_idle
urn:SSLy:facilities:Operational_status_Non-operational
urn:SSLy:facilities:Operational_status_Partially_Operational
urn:SSLy:facilities:Operational_status_Fully_operational
urn:SSLy:facilities:Can_cause_when_working
urn:SSLy:facilities:Can_cause_when_idle
urn:SSLy:facilities:Possible_threat_cases
urn:SSLy:facilities:Invaluable_assets
urn:SSLy:facilities:Cultural_Importance
urn:SSLy:facilities:Use
urn:SSLy:facilities:Construction_year
urn:SSLy:facilities:Last_Renovation_Year
urn:SSLy:facilities:Construction_material
urn:SSLy:facilities:Construction_material_Reinforced_Concrete
urn:SSLy:facilities:Construction_material_Masonry
urn:SSLy:facilities:Construction_material_Steel
urn:SSLy:facilities:Construction_material_Timber
urn:SSLy:facilities:Construction_material_Pre-cast_Concrete
urn:SSLy:facilities:Construction_material_Other
urn:SSLy:facilities:accuracy_year_construction
urn:SSLy:facilities:Number_floors_on_ground
urn:SSLy:facilities:Number_Basements
urn:SSLy:facilities:Number_Building_Occupants
urn:SSLy:facilities:Sensitivity_Issues
urn:SSLy:facilities:Disable_Access_Means
urn:SSLy:damage_assessment:building_code
urn:SSLy:damage_assessment:Damage_Cause
urn:SSLy:damage_assessment:Damage_Type
urn:SSLy:damage_assessment:Damage_Level
urn:SSLy:damage_assessment:Damage_Type
urn:SSLy:damage_assessment:Damage_Floor

urn:SSLy:transport_means:Transport_Mean
urn:SSLy::Transport_Mean_train
urn:SSLy::Transport_Mean_Airplane
urn:SSLy::Transport_Mean_Oil_Tanker
urn:SSLy::Transport_Mean_Gas_Tanker
urn:SSLy::Transport_Mean_Cargo_Ship
urn:SSLy::Transport_Mean_Hospital_Ship
urn:SSLy::Transport_Mean_Ocean_Liner
urn:SSLy::Transport_Mean_Bus
urn:SSLy::Transport_Mean_Truck
urn:SSLy::Transport_Mean_Ambulance
urn:SSLy::Is_Public_Transport
urn:SSLy::Can_Carry_People
urn:SSLy:other:Compound
urn:SSLy:other:Agent_type
urn:SSLy:other:Chem_spectrum_list
urn:SSLy:other:Pollutant
urn:SSLy:other:Video_stream
urn:SSLy:other:Audio_stream
urn:SSLy:other:Video_file
urn:SSLy:other:Audio_file
urn:SSLy:other:Region_name
urn:SSLy:other:Population_name
urn:SSLy:other:Number_inhabitants
urn:SSLy:other:Sensor_message
urn:SSLy:other:Event_Nature
urn:SSLy:other:Event_Nature_Chemical
urn:SSLy:other:Event_Nature_Biological
urn:SSLy:other:Event_Nature_Radiological
urn:SSLy:other:Event_Nature_Nuclear
urn:SSLy:other:Event_Nature_Explossive
urn:SSLy:other:Event_Nature_Natural

D.2 URNs for the synonyms of the field names

urn:SSLy:General:Plane_angle:synonyms:''
urn:SSLy:General:Solid_angle:synonyms:''
urn:SSLy:General:Frequency:synonyms:''

urn:SSLy:General:Activity_radionuclide:synonyms:''

urn:SSLy:General:Absorbed_dose:synonyms:''

urn:SSLy:General:Close_equivalent:synonyms:''

urn:SSLy:General:Catalytic_activity:synonyms:''

urn:SSLy:General:Force:synonyms:''

urn:SSLy:General:Pressure:synonyms:'stress'

urn:SSLy:General:Power:synonyms:''

urn:SSLy:General:Energy:synonyms:''

urn:SSLy:General:Celsius_temperature:synonyms:''

urn:SSLy:General:Electric_charge:synonyms:''

urn:SSLy:General:Magnetic_flux:synonyms:'Magnetic flow'

urn:SSLy:General:Magnetic_flux_density:synonyms:'Magnetic flow density'

urn:SSLy:General:Capacitance:synonyms:''

urn:SSLy:General:Luminous_flux:synonyms:''

urn:SSLy:General:Illuminance:synonyms:''

urn:SSLy:Space_time:Length:synonyms:''

urn:SSLy:Space_time:Width:synonyms:'Breadth'

urn:SSLy:Space_time:Height:synonyms:'depth, altitude'

urn:SSLy:Space_time:Diameter:synonyms:''

urn:SSLy:Space_time:Radius:synonyms:''

urn:SSLy:Space_time:Path_length:synonyms:'Arc length'

urn:SSLy:Space_time:Distance:synonyms:''

urn:SSLy:Space_time:Radial_distance:synonyms:''

urn:SSLy:Space_time:Position_vector:synonyms:''

urn:SSLy:Space_time:Displacement:synonyms:''

urn:SSLy:Space_time:Curvature:synonyms:''

urn:SSLy:Space_time:Area:synonyms:'surface'

urn:SSLy:Space_time:Volume:synonyms:''

urn:SSLy:Space_time:Angular_measure:synonyms:''

urn:SSLy:Space_time:Rotational_displacement:synonyms:''

urn:SSLy:Space_time:Angular_displacement:synonyms:''

urn:SSLy:Space_time:Phase_angle::synonyms:''

urn:SSLy:Space_time:Solid_angular_measure:synonyms:''

urn:SSLy:Space_time:Duration:synonyms:''

urn:SSLy:Space_time:Velocity:synonyms:''

urn:SSLy:Space_time:Speed:synonyms:''

urn:SSLy:Space_time:Acceleration:synonyms:''
urn:SSLy:Space_time:Angular_velocity:synonyms:''
urn:SSLy:Space_time:Angular_acceleration:synonyms:''
urn:SSLy:Space_time:Period_duration,_period:synonyms:''
urn:SSLy:Space_time:Time_constant:synonyms:''
urn:SSLy:Space_time:Rotation:synonyms:''
urn:SSLy:Space_time:Rotation_frequency:synonyms:''
urn:SSLy:Space_time:Rotational_frequency:synonyms:''
urn:SSLy:Space_time:Angular_frequency:synonyms:''
urn:SSLy:Space_time:Wavelength:synonyms:''
urn:SSLy:Space_time:Repetency:synonyms:''
urn:SSLy:Space_time:Wavenumber:synonyms:''
urn:SSLy:Space_time:Wave_vector:synonyms:''
urn:SSLy:Space_time:Angular_repetency:synonyms:''
urn:SSLy:Space_time:Angular_wavenumber:synonyms:''
urn:SSLy:Space_time:Phase_velocity:synonyms:''
urn:SSLy:Space_time:Phase_speed:synonyms:''
urn:SSLy:Space_time:Group_velocity:synonyms:''
urn:SSLy:Space_time:Group_speed:synonyms:''
urn:SSLy:Space_time:Damping_coefficient:synonyms:''
urn:SSLy:Space_time:Logarithmic_decrement:synonyms:''
urn:SSLy:Space_time:Attenuation:synonyms:''
urn:SSLy:Space_time:Extinction:synonyms:''
urn:SSLy:Space_time:Phase_coefficient:synonyms:''
urn:SSLy:Space_time:Propagation_coefficient:synonyms:''
urn:SSLy:Mechanics:Mass:synonyms:''
urn:SSLy:Mechanics:Density:synonyms:''
urn:SSLy:Mechanics:Mass_density:synonyms:''
urn:SSLy:Mechanics:Specific_Volume:synonyms:''
urn:SSLy:Mechanics:Relative_density:synonyms:'relative mass density'
urn:SSLy:Mechanics:Specific_volume:synonyms:''
urn:SSLy:Mechanics:Relative_density:synonyms:''
urn:SSLy:Mechanics:Relative_mass_density:synonyms:''
urn:SSLy:Mechanics:Surface_density:synonyms:''
urn:SSLy:Mechanics:Surface_mass_density:synonyms:''
urn:SSLy:Mechanics:Linear_density:synonyms:''

urn:SSLy:Mechanics:Linear_mass_density:synonyms:''
urn:SSLy:Mechanics:Moment_inertia:synonyms:''
urn:SSLy:Mechanics:Momentum:synonyms:''
urn:SSLy:Mechanics:Weight:synonyms:''
urn:SSLy:Mechanics:Static_friction:synonyms:'Static friction force'
urn:SSLy:Mechanics:Kinetic_friction:synonyms:''
urn:SSLy:Mechanics:Dynamic_friction_force:synonyms:''
urn:SSLy:Mechanics:Rolling_resistance:synonyms:''
urn:SSLy:Mechanics:Rolling_drag:synonyms:''
urn:SSLy:Mechanics:Rolling_friction_mode:synonyms:''
urn:SSLy:Mechanics:Drag_force:synonyms:''
urn:SSLy:Mechanics:Impulse:synonyms:''
urn:SSLy:Mechanics:Angular_momentum:synonyms:''
urn:SSLy:Mechanics:Torque:synonyms:''
urn:SSLy:Mechanics:Angular_impulse:synonyms:''
urn:SSLy:Mechanics:Gauge_pressure:synonyms:''
urn:SSLy:Mechanics:Normal_stress:synonyms:''
urn:SSLy:Mechanics:Shear_stress:synonyms:''
urn:SSLy:Mechanics:Strain:synonyms:''
urn:SSLy:Mechanics:Relative_linear_strain:synonyms:''
urn:SSLy:Mechanics:Shear_strain:synonyms:''
urn:SSLy:Mechanics:Relative_volume_strain:synonyms:''
urn:SSLy:Mechanics:Poisson_number:synonyms:''
urn:SSLy:Mechanics:Modulus_elasticity:synonyms:'young modulus'
urn:SSLy:Mechanics:Modulus_compression:synonyms:'bulk modulus'
urn:SSLy:Mechanics:Compressibility:synonyms:''
urn:SSLy:Mechanics:Second_axial_moment_area:synonyms:''
urn:SSLy:Mechanics:Second_polar_moment_area:synonyms:''
urn:SSLy:Mechanics:Section_modulus:synonyms:''
urn:SSLy:Mechanics:Static_friction_coefficient:synonyms:'coefficient of static friction'
urn:SSLy:Mechanics:Kinetic_friction_factor:synonyms:'dynamic friction factor'
urn:SSLy:Mechanics:Rolling_resistance_factor:synonyms:''
urn:SSLy:Mechanics:Drag_factor:synonyms:''
urn:SSLy:Mechanics:Viscosity:synonyms:'Dynamic viscosity'
urn:SSLy:Mechanics:Kinematic_viscosity:synonyms:''
urn:SSLy:Mechanics:Surface_tension:synonyms:''

urn:SSLy:Mechanics:Potential_energy:synonyms:''

urn:SSLy:Mechanics:Kinetic_energy:synonyms:''

urn:SSLy:Mechanics:Mechanical_energy:synonyms:''

urn:SSLy:Mechanics:Work,_mechanical_work:synonyms:''

urn:SSLy:Mechanics:Efficiency:synonyms:''

urn:SSLy:Mechanics:Mass_flow:synonyms:''

urn:SSLy:Mechanics:Mass_flow_rate:synonyms:''

urn:SSLy:Mechanics:Mass_change_rate:synonyms:''

urn:SSLy:Mechanics:Volume_flow_rate:synonyms:'wind speed (specific for wind)'

urn:SSLy:Mechanics:Action:synonyms:''

urn:SSLy:Thermodynamics:Temperature:synonyms:'Thermodynamic temperature'

urn:SSLy:Thermodynamics:Linear_expansion_coefficient:synonyms:''

urn:SSLy:Thermodynamics:Cubic_expansion_coefficient:synonyms:''

urn:SSLy:Thermodynamics:Relative_expansion_coefficient:synonyms:''

urn:SSLy:Thermodynamics:Relative_pressure_coefficient:synonyms:''

urn:SSLy:Thermodynamics:Pressure_coefficient:synonyms:''

urn:SSLy:Thermodynamics:Isothermal_compressibility:synonyms:''

urn:SSLy:Thermodynamics:Isentropic_compressibility:synonyms:''

urn:SSLy:Thermodynamics:Heat:synonyms:'amount of heat'

urn:SSLy:Thermodynamics:Latent_heat:synonyms:''

urn:SSLy:Thermodynamics:Heat_flow_rate:synonyms:''

urn:SSLy:Thermodynamics:Density_heat_flow_rate:synonyms:''

urn:SSLy:Thermodynamics:Thermal_conductivity:synonyms:''

urn:SSLy:Thermodynamics:Coefficient_heat_transfer:synonyms:''

urn:SSLy:Thermodynamics:Surface_coefficient_heat_transfer:synonyms:''

urn:SSLy:Thermodynamics:Thermal_insulance:synonyms:'coefficient of thermal insulancethermal resistance in building technology'

urn:SSLy:Thermodynamics:Thermal_resistance:synonyms:''

urn:SSLy:Thermodynamics:Thermal_conductance:synonyms:'transfer coefficient'

urn:SSLy:Thermodynamics:Thermal_diffusivity:synonyms:''

urn:SSLy:Thermodynamics:Heat_capacity:synonyms:''

urn:SSLy:Thermodynamics:Specific_heat_capacity_at_constant_pressure:synonyms:''

urn:SSLy:Thermodynamics:Specific_heat_capacity_at_constant_volume:synonyms:''

urn:SSLy:Thermodynamics:Specific_heat_capacity_at_saturated_vapour_pressure:synonyms:''

urn:SSLy:Thermodynamics:Ratio_specific_heat_capacities:synonyms:''

urn:SSLy:Thermodynamics:Isentropic_exponent:synonyms:', isentropic expansion factor'

urn:SSLy:Thermodynamics:Entropy:synonyms:''

urn:SSLy:Thermodynamics:Specific_entropy:synonyms:''
urn:SSLy:Thermodynamics:Internal_Energy,_thermodynamic_energy:synonyms:''
urn:SSLy:Thermodynamics:Enthalpy:synonyms:''
urn:SSLy:Thermodynamics:Helmboltz_energy:synonyms:', Hemboltz function'
urn:SSLy:Thermodynamics:Gibbs_energy:synonyms:', Gibbs function'
urn:SSLy:Thermodynamics:Specific_energy:synonyms:''
urn:SSLy:Thermodynamics:Specific_internal_energy:synonyms:', specific thermodynamic energy'
urn:SSLy:Thermodynamics:Specific_enthalpy:synonyms:''
urn:SSLy:Thermodynamics:Specific_Helmholtz_energy:synonyms:', specific Helmholtz function'
urn:SSLy:Thermodynamics:Specific_Gibbs_energy:synonyms:''
urn:SSLy:Thermodynamics:Specific_Gibbs_function:synonyms:''
urn:SSLy:Thermodynamics:Massieu_function:synonyms:''
urn:SSLy:Thermodynamics:Planck_function:synonyms:''
urn:SSLy:Thermodynamics:Joule-Thomson_coefficient:synonyms:''
urn:SSLy:Thermodynamics:Thermodynamic_Efficiency:synonyms:''
urn:SSLy:Thermodynamics:Maximum_efficiency:synonyms:''
urn:SSLy:Thermodynamics:Specific_gas_constant:synonyms:''
urn:SSLy:Thermodynamics:Mass_concentration_water:synonyms:''
urn:SSLy:Thermodynamics:Mass_concentration_water_vapour:synonyms:', absolute humidity'
urn:SSLy:Thermodynamics:Mass_ratio_water_to_dry_matter:synonyms:''
urn:SSLy:Thermodynamics:Mass_ratio_water_vapour_to_dry_gas:synonyms:''
urn:SSLy:Thermodynamics:Mass_fraction_water:synonyms:''
urn:SSLy:Thermodynamics:Mass_fraction_dry_matter:synonyms:''
urn:SSLy:Thermodynamics:Relative_humidity:synonyms:''
urn:SSLy:Thermodynamics:Relative_mass_concentration_vapour:synonyms:''
urn:SSLy:Thermodynamics:Relative_mass_ratio_vapour:synonyms:''
urn:SSLy:Thermodynamics:Dew-point_temperature:synonyms:''
urn:SSLy:Electromagnetism:Electric current:synonyms:''
urn:SSLy:Electromagnetism:Elementary_charge:synonyms:''
urn:SSLy:Electromagnetism:Electric_charge_density:synonyms:'volumetric electric charge'
urn:SSLy:Electromagnetism:Surface_density_electric_charge:synonyms:''
urn:SSLy:Electromagnetism:Linear_density_electric_charge:synonyms:''
urn:SSLy:Electromagnetism:Electric_dipole_moment:synonyms:''
urn:SSLy:Electromagnetism:Electric_polarization:synonyms:''
urn:SSLy:Electromagnetism:Electric_current_density:synonyms:''
urn:SSLy:Electromagnetism:Linear_electric_current_density:synonyms:''

urn:SSLy:Electromagnetism:Electric_field_strength:synonyms:''

urn:SSLy:Electromagnetism:Electric_potential:synonyms:''

urn:SSLy:Electromagnetism:Electric_potential_difference:synonyms:'difference of potential'

urn:SSLy:Electromagnetism:Voltage:synonyms:'electric tension'

urn:SSLy:Electromagnetism:Induced_voltage:synonyms:''

urn:SSLy:Electromagnetism:Electric_flux_density:synonyms:''

urn:SSLy:Electromagnetism:Permittivity:synonyms:''

urn:SSLy:Electromagnetism:Relative_permittivity:synonyms:''

urn:SSLy:Electromagnetism:Electric_susceptibility:synonyms:''

urn:SSLy:Electromagnetism:Electric_flux:synonyms:''

urn:SSLy:Electromagnetism:Displacement_current_density:synonyms:''

urn:SSLy:Electromagnetism:Displacement_current:synonyms:''

urn:SSLy:Electromagnetism:Total_current:synonyms:''

urn:SSLy:Electromagnetism:Total_current_density:synonyms:''

urn:SSLy:Electromagnetism:Linked_flux:synonyms:'protoflux'

urn:SSLy:Electromagnetism:Magnetic_flux:synonyms:''

urn:SSLy:Electromagnetism:Total_magnetic_flux:synonyms:''

urn:SSLy:Electromagnetism:Magnetic_moment:synonyms:'Magnetic area moment'

urn:SSLy:Electromagnetism:Magnetization:synonyms:''

urn:SSLy:Electromagnetism:Magnetic_field_strength:synonyms:'magnetizing field'

urn:SSLy:Electromagnetism:Permeability:synonyms:''

urn:SSLy:Electromagnetism:Relative_permeability:synonyms:''

urn:SSLy:Electromagnetism:Magnetic_susceptibility:synonyms:''

urn:SSLy:Electromagnetism:Magnetic_polarization:synonyms:''

urn:SSLy:Electromagnetism:Magnetic_dipole_moment:synonyms:''

urn:SSLy:Electromagnetism:Coercivity:synonyms:'coercive field strength'

urn:SSLy:Electromagnetism:Magnetic_vector_potential:synonyms:''

urn:SSLy:Electromagnetism:Electromagnetic-energy_density:synonyms:'volumic electro-magnetic energy'

urn:SSLy:Electromagnetism:Pointing_vector:synonyms:''

urn:SSLy:Electromagnetism:Phase_speed_electromagnetic_waves:synonyms:''

urn:SSLy:Electromagnetism:Source_voltage:synonyms:'source tension'

urn:SSLy:Electromagnetism:Scalar_magnetic_potential:synonyms:'Magnetic potential'

urn:SSLy:Electromagnetism:Magnetic_tension:synonyms:''

urn:SSLy:Electromagnetism:Magnetomotive_force:synonyms:''

urn:SSLy:Electromagnetism:Current_linkage:synonyms:''

urn:SSLy:Electromagnetism:Number_turns_is_winding:synonyms:''

urn:SSLy:Electromagnetism:Reluctance:synonyms:''
urn:SSLy:Electromagnetism:Permeance:synonyms:''
urn:SSLy:Electromagnetism:Inductance:synonyms:'self inductance'
urn:SSLy:Electromagnetism:Mutual_inductance:synonyms:''
urn:SSLy:Electromagnetism:Coupling_factor:synonyms:''
urn:SSLy:Electromagnetism:Leakage_factor:synonyms:''
urn:SSLy:Electromagnetism:Conductivity:synonyms:''
urn:SSLy:Electromagnetism:Resistivity:synonyms:''
urn:SSLy:Electromagnetism:instantaneous_power:synonyms:'power'
urn:SSLy:Electromagnetism:Resistance:synonyms:''
urn:SSLy:Electromagnetism:Conductance:synonyms:''
urn:SSLy:Electromagnetism:Phase_difference:synonyms:''
urn:SSLy:Electromagnetism:Electric_current_phasor:synonyms:''
urn:SSLy:Electromagnetism:Voltage_phasor:synonyms:'electric tension phasor'
urn:SSLy:Electromagnetism:Impedance:synonyms:'complex impedance'
urn:SSLy:Electromagnetism:impedance_vacuum:synonyms:''
urn:SSLy:Electromagnetism:wave_impedance_in_vacuum:synonyms:''
urn:SSLy:Electromagnetism:Resistance_to_alternating_current:synonyms:'Resistance'
urn:SSLy:Electromagnetism:Reactance:synonyms:''
urn:SSLy:Electromagnetism:Apparent_impedance:synonyms:'modulus of impedance'
urn:SSLy:Electromagnetism:Admittance:synonyms:'complex admittance'
urn:SSLy:Electromagnetism:admittance_vacuum:synonyms:''
urn:SSLy:Electromagnetism:apparent_admittance:synonyms:''
urn:SSLy:Electromagnetism:Conductance_for_alternating_current:synonyms:''
urn:SSLy:Electromagnetism:Susceptance:synonyms:''
urn:SSLy:Electromagnetism:Modulus_admittance:synonyms:''
urn:SSLy:Electromagnetism:Quality_factor:synonyms:''
urn:SSLy:Electromagnetism:Loss_factor:synonyms:'dissipation factor'
urn:SSLy:Electromagnetism:Loss_angle:synonyms:''
urn:SSLy:Electromagnetism:Active_power:synonyms:''
urn:SSLy:Electromagnetism:Apparent_power:synonyms:''
urn:SSLy:Electromagnetism:Power_factor:synonyms:''
urn:SSLy:Electromagnetism:Complex_power:synonyms:''
urn:SSLy:Electromagnetism:Reactive_power:synonyms:''
urn:SSLy:Electromagnetism:Non-active_power:synonyms:''
urn:SSLy:Electromagnetism:Active_energy:synonyms:''

urn:SSLy:Light:Speed_light_in_medium:synonyms:''

urn:SSLy:Light:Refractive_index:synonyms:''

urn:SSLy:Light:Electromagnetic_Radiant_energy:synonyms:''

urn:SSLy:Light:Spectral_radiant_energy:synonyms:''

urn:SSLy:Light:Radiant_energy_density:synonyms:''

urn:SSLy:Light:Spectral_radiant_energy_density_terms_wavelength:synonyms:''

urn:SSLy:Light:Spectral_radiant_energy_density_terms_wavenumber:synonyms:''

urn:SSLy:Light:Radiant_flux,_radiant_power:synonyms:''

urn:SSLy:Light:Spectral_radiant_flux:synonyms:'spectral radiant power'

urn:SSLy:Light:Radial_intensity:synonyms:''

urn:SSLy:Light:Spectral_radiant_intensity:synonyms:''

urn:SSLy:Light:Radiance:synonyms:''

urn:SSLy:Light:Spectral_radiance:synonyms:''

urn:SSLy:Light:Irradiance:synonyms:''

urn:SSLy:Light:Spectral_irradiance:synonyms:''

urn:SSLy:Light:Radiant_exitance_(deprecated):synonyms:''

urn:SSLy:Light:Spectral_radial_exitance:synonyms:''

urn:SSLy:Light:Radiant_exposure:synonyms:''

urn:SSLy:Light:Spectral_radiant_exposure:synonyms:''

urn:SSLy:Light:Luminous_efficiency:synonyms:''

urn:SSLy:Light:Spectral_luminous_efficiency:synonyms:''

urn:SSLy:Light:Luminous_efficacy_radiation:synonyms:''

urn:SSLy:Light:Spectral_luminous_efficacy:synonyms:''

urn:SSLy:Light:Maximum_luminous_efficacy:synonyms:''

urn:SSLy:Light:Luminous_efficacy_source:synonyms:''

urn:SSLy:Light:Luminous_energy_(deprecated):synonyms:''

urn:SSLy:Light:Luminous_intensity:synonyms:'light intensity'

urn:SSLy:Light:Luminance:synonyms:''

urn:SSLy:Light:Luminous_exitance:synonyms:''

urn:SSLy:Light:Luminous_exposure:synonyms:'quantity of illumination, light exposure'

urn:SSLy:Light:Photon_number:synonyms:'number of photons'

urn:SSLy:Light:Photon_energy:synonyms:''

urn:SSLy:Light:Photon_flux:synonyms:''

urn:SSLy:Light:Photon_intensity:synonyms:''

urn:SSLy:Light:Photon_radiance:synonyms:''

urn:SSLy:Light:Photon_irradiance:synonyms:''

urn:SSLy:Light:Photon_exitance:synonyms:''

urn:SSLy:Light:Photon_exposure:synonyms:''

urn:SSLy:Light:Tristimulus_values_for_CIE_1931:synonyms:''

urn:SSLy:Light:Tristimulus_values_for_CIE_1964:synonyms:''

urn:SSLy:Light:CIE_colour-matching_functions_for_CIE_1931:synonyms:''

urn:SSLy:Light:CIE_colour-matching_functions_for_CIE_1964:synonyms:''

urn:SSLy:Light:Chromaticity_coordinates_CIE_1931:synonyms:''

urn:SSLy:Light:Chromaticity_coordinates_CIE_1964:synonyms:''

urn:SSLy:Light:Colour_temperature:synonyms:''

urn:SSLy:Light:Correlated_colour_temperature:synonyms:''

urn:SSLy:Light:Emissivity:synonyms:''

urn:SSLy:Light:Emissivity_at_specified_wavelength:synonyms:''

urn:SSLy:Light:Absorptance:synonyms:''

urn:SSLy:Light:Luminous_absorptance:synonyms:''

urn:SSLy:Light:Reflectance:synonyms:''

urn:SSLy:Light:Luminous_reflectance:synonyms:''

urn:SSLy:Light:Transmittance:synonyms:''

urn:SSLy:Light:Luminous_transmittance:synonyms:''

urn:SSLy:Light:Transmittance_optical_density:synonyms:'optical density, transmittance density, decadic absorbance'

urn:SSLy:Light:Napierian_absorbance:synonyms:''

urn:SSLy:Light:Radiance_factor:synonyms:''

urn:SSLy:Light:Luminance_factor:synonyms:''

urn:SSLy:Light:Reflectance_factor:synonyms:''

urn:SSLy:Light:Linear_attenuation_coefficient:synonyms:'linear extinction coefficient'

urn:SSLy:Light:Linear_absorption_coefficient:synonyms:''

urn:SSLy:Light:Mass_attenuation_coefficient:synonyms:''

urn:SSLy:Light:Mass_absorption_coefficient:synonyms:''

urn:SSLy:Light:Molar_absorption_coefficient:synonyms:''

urn:SSLy:Acoustics:Logarithmic_frequency_rate:synonyms:''

urn:SSLy:Acoustics:Static_pressure:synonyms:''

urn:SSLy:Acoustics:Sound_pressure:synonyms:''

urn:SSLy:Acoustics:Sound_particle_displacement:synonyms:''

urn:SSLy:Acoustics:Sound_particle_velocity:synonyms:''

urn:SSLy:Acoustics:Sound_particle_acceleration:synonyms:''

urn:SSLy:Acoustics:Volume_velocity,_volume_flow_rate:synonyms:''

urn:SSLy:Acoustics:Sound_energy_density:synonyms:''

urn:SSLy:Acoustics:Sound_energy:synonyms:''

urn:SSLy:Acoustics:Sound_power:synonyms:''

urn:SSLy:Acoustics:Sound_intensity:synonyms:''

urn:SSLy:Acoustics:Sound_exposure:synonyms:''

urn:SSLy:Acoustics:Characteristic_impedance_medium_for_longitudinal_waves:synonyms:''

urn:SSLy:Acoustics:Acoustic_impedance:synonyms:''

urn:SSLy:Acoustics:Sound_pressure_level:synonyms:''

urn:SSLy:Acoustics:Sound_power_level:synonyms:''

urn:SSLy:Acoustics:Sound_exposure_level:synonyms:''

urn:SSLy:Acoustics:Reverberation_level:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Number_entities:synonyms:'Number of entities'

urn:SSLy:Phys_chem_mol_phys:Amount_substance:synonyms:'Number of moles'

urn:SSLy:Phys_chem_mol_phys:Relative_atomic_mass:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_mass:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_volume:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_internal_energy:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_enthalpy:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_Helmholtz_energy:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_Gibbs_energy:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_heat_capacity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_entropy:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Particle_concentration:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molecular_concentration:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Mass_concentration:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Mass_fraction:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Amount_substance_concentration:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Standard_amount_substance_concentration:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Amount_substance_fraction:synonyms:'mole fraction'

urn:SSLy:Phys_chem_mol_phys:Volume_fraction:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molality:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Latent_heat_phase_transition:synonyms:'enthalpy of phase transition'

urn:SSLy:Phys_chem_mol_phys:Chemical_potential:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Absolute_activity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Partial_pressure:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Fugacity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Standard_chemical_potential:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Activity_factor:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Standard_absolute_activity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Activity_solute:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Relative_activity_solute:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Activity_coefficient:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Standard_absolute_activity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Activity_solvent,_relative_activity_solvent:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Osmotic_factor_solvent,_osmotic_coefficient_solvent:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Standard_absolute_activity_solvent:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Osmotic_pressure:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Stoichiometric_number_substance:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Affinity_chemical_reaction:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Extent_reaction:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Standard_equilibrium_constant:synonyms:'thermodynamic equilibrium constant'

urn:SSLy:Phys_chem_mol_phys:Equilibrium_constant_pressure_basis:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Equilibrium_constant_concentration_basis:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Microcanonical_partition_function:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Canonical_partition_function:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Grand-canonical_partition_function:synonyms:'grand partition function'

urn:SSLy:Phys_chem_mol_phys:Molecular_partition_function:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Partition_function_molecule:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Statistical_weight_subsystem:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Degeneracy,_multiplicity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_gas_constant:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Specific_gas_constant:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Mean_free_path:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Diffusion_coefficient:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Thermal_diffusion_ratio:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Thermal_diffusion_factor:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Thermal_diffusion_coefficient:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Ionic_strength:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Degree_dissociation,_dissociation_fraction:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Electrolytic_conductivity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_conductivity:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Transport_number__ion_B,_current_fraction__ion_B:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Angle_optical_rotation:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Molar_optical_rotatory_power:synonyms:''

urn:SSLy:Phys_chem_mol_phys:Specific_optical_rotatory_power:synonyms:''

urn:SSLy:Phys_chem_mol_phys: Need_for_additional_field_for_concept_B?:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Atomic_number:synonyms:'proton number'

urn:SSLy:Atomic_nuclear_phys:Neutron_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Nucleon_number:synonyms:'mass number'

urn:SSLy:Atomic_nuclear_phys:Rest_mass:synonyms:'proper mass'

urn:SSLy:Atomic_nuclear_phys:Rest_energy:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Atomic_mass:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Nuclidic_mass:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Unified_atomic_mass_constant:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Elementary_charge:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Charge_number:synonyms:'ionization number'

urn:SSLy:Atomic_nuclear_phys:Bohr_radius:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Rydberg_constant:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Hartree_energy:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Magnetic_dipole_moment:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Bohr_magneton:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Nuclear_magneton:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Spin:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Total_angular_momentum:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Gyromagnetic_ratio:synonyms:' magnetogyric ratio, gyromagnetic coefficient'

urn:SSLy:Atomic_nuclear_phys:Gyromagnetic_ratio__electron:synonyms:'magnetogyric ratio of the electron, gyromagnetic coefficient of the electron'

urn:SSLy:Atomic_nuclear_phys:Quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Principal_quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Orbital_angular_momentum_quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Magnetic_quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Spin_quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Total_angular_momentum_quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Nuclear_spin_quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Hyperfine_structure_quantum_number:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Landé_factor:synonyms:'g factor atom'

urn:SSLy:Atomic_nuclear_phys:g_factor:synonyms:'nucleus or nuclear particle'

urn:SSLy:Atomic_nuclear_phys:Larmor_angular_frequency:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Larmor_frequency:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Nuclear_precession_angular_frequency:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Cyclotron_angular_frequency:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Gyroradius:synonyms:'Larmor radius'
urn:SSLy:Atomic_nuclear_phys:Nuclear_quadrupole_moment:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Nuclear_radius:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Electron_radius:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Compton_wavelength:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Mass_excess:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Mass_defect:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Relative_mass_excess:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Relative_mass_defect:synonyms:''
urn:SSLy:Atomic_nuclear_phys:packing_fraction:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Binding_fraction:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Decay_constant:synonyms:'disintegration'
urn:SSLy:Atomic_nuclear_phys:Mean_duration_life:synonyms:'mean life time'
urn:SSLy:Atomic_nuclear_phys:Level_width:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Activity:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Specific_activity:synonyms:'massic activity'
urn:SSLy:Atomic_nuclear_phys:Activity_density:synonyms:'volumic activity, activity concentration'
urn:SSLy:Atomic_nuclear_phys:Surface-activity_density:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Half_life:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Alpha_disintegration_energy:synonyms:''
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urn:SSLy:Atomic_nuclear_phys:Direction_and_energy_distribution_cross_section:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Volumic_cross_section:synonyms:'macroscopic cross section'
urn:SSLy:Atomic_nuclear_phys:Volumic_total_cross_section:synonyms:'macroscopic total cross section'
urn:SSLy:Atomic_nuclear_phys:Particle_fluence:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Particle_fluence_rate:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Ionic_radiant_energy:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Energy_influence:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Energy_influence_rate:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Particle_current_density:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Linear_attenuation_coefficient:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Mass_attenuation_coefficient:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Molar_attenuation_coefficient:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Atomic_attenuation_coefficient:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Half-value_thickness:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Total_linear_stopping_power:synonyms:'linear stopping power'

urn:SSLy:Atomic_nuclear_phys:Total_mass_stopping_power:synonyms:'mass stopping power'

urn:SSLy:Atomic_nuclear_phys:Mean_linear_range:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Mean_mass_range:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Linear_ionization:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Total_ionization:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Average_energy_loss_per_elementary_charge_produced:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Mobility:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Particle_number_density:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Ion_numbed_density:synonyms:'ion density'

urn:SSLy:Atomic_nuclear_phys:Recombination_coefficient:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Diffusion_coefficient:synonyms:'diffusion coefficient for particle number density'

urn:SSLy:Atomic_nuclear_phys:Diffusion_coefficient_for_fluence_rate:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Particle_source_density:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Slowing-down_density:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Resonance_escape_probability:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Lethargy:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Average_logarithmic_energy_decrement:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Mean_free_path:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Slowing-down_area:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Diffusion_area:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Migration_area:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Slowing-down_length:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Diffusion_length:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Migration_length:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Neutron_yield_per_absorption:synonyms:''

urn:SSLy:Atomic_nuclear_phys:Fast_fission_factor:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Thermal_utilization_factor:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Non-leakage_probability:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Multiplication_factor:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Infinite_multiplication_factor:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Reactor_time_constant:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Energy_imparted:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Main_energy_imparted:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Absorbed_dose:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Specific_energy_imparted:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Quality_factor_ionizing_radiation:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Dose_equivalent:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Dose_equivalent_rate:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Linear_energy_transfer:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Kerma:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Kerma_rate:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Mass_energy-transfer_coefficient:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Exposure:synonyms:''
urn:SSLy:Atomic_nuclear_phys:Exposure_rate:synonyms:''
urn:SSLy:Characteristic_numbers:Reynolds_number:synonyms:''
urn:SSLy:Characteristic_numbers:Euler_number:synonyms:''
urn:SSLy:Characteristic_numbers:Froude_number:synonyms:''
urn:SSLy:Characteristic_numbers:Grash_number:synonyms:''
urn:SSLy:Characteristic_numbers:Weber_number:synonyms:''
urn:SSLy:Characteristic_numbers:Mach_number:synonyms:''
urn:SSLy:Characteristic_numbers:Knudsen_number:synonyms:''
urn:SSLy:Characteristic_numbers:Strouhal_number:synonyms:'Thomson number'
urn:SSLy:Characteristic_numbers:Drag_coefficient:synonyms:''
urn:SSLy:Characteristic_numbers:Bagnold_number:synonyms:''
urn:SSLy:Characteristic_numbers:Lift_coefficient:synonyms:''
urn:SSLy:Characteristic_numbers:Thrust_coefficient:synonyms:''
urn:SSLy:Characteristic_numbers:Dean_number:synonyms:''
urn:SSLy:Characteristic_numbers:Bejan_number:synonyms:''
urn:SSLy:Characteristic_numbers:Lagrange_number:synonyms:''
urn:SSLy:Characteristic_numbers:Bingham_number:synonyms:'plasticity number'
urn:SSLy:Characteristic_numbers:Hedström_number:synonyms:''

urn:SSLy:Characteristic_numbers:Bodenstein_number:synonyms:''

urn:SSLy:Characteristic_numbers:Rossby_number:synonyms:'Klebel number'

urn:SSLy:Characteristic_numbers:Ekman_number:synonyms:''

urn:SSLy:Characteristic_numbers:Elasticity_number:synonyms:''

urn:SSLy:Characteristic_numbers:Darcy_friction_factor:synonyms:'Moody friction faction'

urn:SSLy:Characteristic_numbers:Fanning_number:synonyms:''

urn:SSLy:Characteristic_numbers:Goertler_number:synonyms:'Goertler parameter'

urn:SSLy:Characteristic_numbers:Hagen_number:synonyms:''

urn:SSLy:Characteristic_numbers:Laval_number:synonyms:''

urn:SSLy:Characteristic_numbers:Poiseuille_number:synonyms:''

urn:SSLy:Characteristic_numbers:Power_number:synonyms:''

urn:SSLy:Characteristic_numbers:Richardson_number:synonyms:''

urn:SSLy:Characteristic_numbers:Reech_number:synonyms:''

urn:SSLy:Characteristic_numbers:Stokes_number_time_related:synonyms:''

urn:SSLy:Characteristic_numbers:Stokes_number_vibrating_particles:synonyms:''

urn:SSLy:Characteristic_numbers:Stokes_number_rotameter:synonyms:' power coefficient rotameter'

urn:SSLy:Characteristic_numbers:Stokes_number_gravity:synonyms:''

urn:SSLy:Characteristic_numbers:Stokes_number_drag:synonyms:''

urn:SSLy:Characteristic_numbers:Laplace_number:synonyms:'Suratman number'

urn:SSLy:Characteristic_numbers:Blake_number:synonyms:''

urn:SSLy:Characteristic_numbers:Sommerfeld_number:synonyms:''

urn:SSLy:Characteristic_numbers:Taylor_number_momentum_transfer:synonyms:''

urn:SSLy:Characteristic_numbers:Galilei_number:synonyms:''

urn:SSLy:Characteristic_numbers:Womersley_number:synonyms:''

urn:SSLy:Characteristic_numbers:Fourier_number:synonyms:''

urn:SSLy:Characteristic_numbers:Péclet_number:synonyms:''

urn:SSLy:Characteristic_numbers:Rayleigh_number:synonyms:''

urn:SSLy:Characteristic_numbers:Froude_number:synonyms:''

urn:SSLy:Characteristic_numbers:Nusselt_number:synonyms:''

urn:SSLy:Characteristic_numbers:Blot_number:synonyms:''

urn:SSLy:Characteristic_numbers:Stanton_number:synonyms:''

urn:SSLy:Characteristic_numbers:J-factor:synonyms:'heat transfer factor, Colburn number'

urn:SSLy:Characteristic_numbers:Bejan_number_heat_transfer:synonyms:''

urn:SSLy:Characteristic_numbers:Bejan_number_entropy:synonyms:''

urn:SSLy:Characteristic_numbers:Stefan_number:synonyms:''

urn:SSLy:Characteristic_numbers:Brinkman_number:synonyms:''

urn:SSLy:Characteristic_numbers:Clausius_number:synonyms:''
urn:SSLy:Characteristic_numbers:Carnot_number:synonyms:''
urn:SSLy:Characteristic_numbers:Eckert_number:synonyms:'Dulong number'
urn:SSLy:Characteristic_numbers:Graetz_number:synonyms:''
urn:SSLy:Characteristic_numbers:Heat_transfer_number:synonyms:''
urn:SSLy:Characteristic_numbers:Pomerantsev_number:synonyms:''
urn:SSLy:Characteristic_numbers:Boltzmann_number:synonyms:''
urn:SSLy:Characteristic_numbers:Stark_number:synonyms:''
urn:SSLy:Condensed_matter_phys:Lattice_vector:synonyms:''
urn:SSLy:Condensed_matter_phys:Fundamental_lattice_vectors:synonyms:''
urn:SSLy:Condensed_matter_phys:Angular_reciprocal_lattice_vector:synonyms:''
urn:SSLy:Condensed_matter_phys:Fundamental_reciprocal_lattice_vectors:synonyms:''
urn:SSLy:Condensed_matter_phys:Lattice_plane_spacing:synonyms:''
urn:SSLy:Condensed_matter_phys:Bragg_angle:synonyms:''
urn:SSLy:Condensed_matter_phys:Short-range_order_parameter:synonyms:''
urn:SSLy:Condensed_matter_phys:Long-range_order_parameter:synonyms:''
urn:SSLy:Condensed_matter_phys:Atomic_scattering_factor:synonyms:''
urn:SSLy:Condensed_matter_phys:Structure_factor:synonyms:''
urn:SSLy:Condensed_matter_phys:Burgers_vector:synonyms:''
urn:SSLy:Condensed_matter_phys:Particle_position_vector:synonyms:''
urn:SSLy:Condensed_matter_phys:Equilibrium_position_vector:synonyms:''
urn:SSLy:Condensed_matter_phys:Displacement_vector:synonyms:''
urn:SSLy:Condensed_matter_phys:Debye-Waller_factor:synonyms:''
urn:SSLy:Condensed_matter_phys:Angular_wavenumber:synonyms:'angular repetency'
urn:SSLy:Condensed_matter_phys:Fermi_angular_wavenumber:synonyms:'Fermi angular repetency'
urn:SSLy:Condensed_matter_phys:Debye_angular_wavenumber:synonyms:'Debye angular repetency'
urn:SSLy:Condensed_matter_phys:Debye_angular_frequency:synonyms:'Debye angular frequency'
urn:SSLy:Condensed_matter_phys:Debye_temperature:synonyms:''
urn:SSLy:Condensed_matter_phys:Density_vibration_states:synonyms:''
urn:SSLy:Condensed_matter_phys:Thermodynamic_Grüneisen_parameter:synonyms:''
urn:SSLy:Condensed_matter_phys:Grüneisen_parameter:synonyms:''
urn:SSLy:Condensed_matter_phys:Mean_free_path_photons:synonyms:''
urn:SSLy:Condensed_matter_phys:Mean_free_path_electrons:synonyms:''
urn:SSLy:Condensed_matter_phys:Energy_density_states:synonyms:''
urn:SSLy:Condensed_matter_phys:Residual_resistivity:synonyms:''
urn:SSLy:Condensed_matter_phys:Lorenz_coefficient:synonyms:''

urn:SSLy:Condensed_matter_phys:Hall_coefficient:synonyms:''
urn:SSLy:Condensed_matter_phys:Thermoelectric_voltage:synonyms:''
urn:SSLy:Condensed_matter_phys:Seebeck_coefficient:synonyms:''
urn:SSLy:Condensed_matter_phys:Peltier_coefficient:synonyms:''
urn:SSLy:Condensed_matter_phys:Thomson_coefficient:synonyms:''
urn:SSLy:Condensed_matter_phys:Work_function:synonyms:''
urn:SSLy:Condensed_matter_phys:Ionization_energy:synonyms:''
urn:SSLy:Condensed_matter_phys:Electron_affinity:synonyms:''
urn:SSLy:Condensed_matter_phys:Richardson_constant:synonyms:''
urn:SSLy:Condensed_matter_phys:Fermy_energy:synonyms:''
urn:SSLy:Condensed_matter_phys:Gap_energy:synonyms:''
urn:SSLy:Condensed_matter_phys:Fermi_temperature:synonyms:''
urn:SSLy:Condensed_matter_phys:Electron_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Hole_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Intrinsic_carrier_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Donor_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Acceptor_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Effective_mass:synonyms:''
urn:SSLy:Condensed_matter_phys:Mobility_ratio:synonyms:''
urn:SSLy:Condensed_matter_phys:Relaxation_time:synonyms:''
urn:SSLy:Condensed_matter_phys:Carrier_lifetime:synonyms:''
urn:SSLy:Condensed_matter_phys:Diffusion_length:synonyms:''
urn:SSLy:Condensed_matter_phys:Exchange_integral:synonyms:''
urn:SSLy:Condensed_matter_phys:Curie_temperature:synonyms:''
urn:SSLy:Condensed_matter_phys:Néel_temperature:synonyms:''
urn:SSLy:Condensed_matter_phys:Superconductor_transition_temperature:synonyms:''
urn:SSLy:Condensed_matter_phys:Thermodynamic_critical_magnetic_flux_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Lower_critical_magnetic_flux_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Upper_critical_magnetic_flux_density:synonyms:''
urn:SSLy:Condensed_matter_phys:Superconductor_energy_gap:synonyms:''
urn:SSLy:Condensed_matter_phys:London_penetration_gap:synonyms:''
urn:SSLy:Condensed_matter_phys:Coherence_length:synonyms:''
urn:SSLy:info_science_tech:Traffic_intensity:synonyms:''
urn:SSLy:info_science_tech:Traffic_offered_intensity:synonyms:''
urn:SSLy:info_science_tech:traffic load:synonyms:'Traffic carried intensity'
urn:SSLy:info_science_tech:Mean_queue_length:synonyms:''

urn:SSLy:info_science_tech:Loss_probability:synonyms:''

urn:SSLy:info_science_tech:Waiting_probability:synonyms:''

urn:SSLy:info_science_tech:Call_intensity:synonyms:'calling rate'

urn:SSLy:info_science_tech:Completed_call_intensity:synonyms:''

urn:SSLy:info_science_tech:Storage_capacity:synonyms:'storage size'

urn:SSLy:info_science_tech:Equivalent_binary_storage_capacity:synonyms:''

urn:SSLy:info_science_tech:Transfer_rate:synonyms:''

urn:SSLy:info_science_tech:Period_data_elements:synonyms:''

urn:SSLy:info_science_tech:bit_rate:synonyms:'binary digit rate'

urn:SSLy:info_science_tech:bit_period:synonyms:'Period of binary digits'

urn:SSLy:info_science_tech:equivalent_bit_rate:synonyms:'Equivalent binary digit rate'

urn:SSLy:info_science_tech:Modulation_rate:synonyms:'line digit rate'

urn:SSLy:info_science_tech:Quantizing_distortion_power:synonyms:''

urn:SSLy:info_science_tech:Carrier_power:synonyms:''

urn:SSLy:info_science_tech:Signal_energy_per_binary_digit:synonyms:''

urn:SSLy:info_science_tech:Error_probability:synonyms:''

urn:SSLy:info_science_tech:Hamming_distance:synonyms:''

urn:SSLy:info_science_tech:Clock_frequency:synonyms:'clock rate'

urn:SSLy:info_science_tech:Decision_content:synonyms:''

urn:SSLy:info_science_tech:Information_content:synonyms:''

urn:SSLy:info_science_tech:Information_entropy:synonyms:''

urn:SSLy:info_science_tech:Maximum_entropy:synonyms:''

urn:SSLy:info_science_tech:Relative_entropy:synonyms:''

urn:SSLy:info_science_tech:Redundancy:synonyms:''

urn:SSLy:info_science_tech:Relative_redundancy:synonyms:''

urn:SSLy:info_science_tech:Joint_information_content:synonyms:''

urn:SSLy:info_science_tech:Conditional_information_content:synonyms:''

urn:SSLy:info_science_tech:Conditional_entropy:synonyms:'mean conditional information content, average conditional information content'

urn:SSLy:info_science_tech:Equivocation:synonyms:''

urn:SSLy:info_science_tech:Irrelevance:synonyms:''

urn:SSLy:info_science_tech:Transinformation_content:synonyms:''

urn:SSLy:info_science_tech:Mean_transinformation_content:synonyms:''

urn:SSLy:info_science_tech:Character_mean_entropy:synonyms:''

urn:SSLy:info_science_tech:Average_information_rate:synonyms:''

urn:SSLy:info_science_tech:Character_mean_transinformation_content:synonyms:''

urn:SSLy:info_science_tech:Average_transinformation_rate:synonyms:''

urn:SSLy:info_science_tech:Channel_capacity_per_character:synonyms:'channel capacity'
urn:SSLy:info_science_tech:Channel_time_capacity:synonyms:'channel capacity'
urn:SSLy:monitoring:Operational_status:synonyms:''
urn:SSLy:monitoring:Status_not_started:synonyms:''
urn:SSLy:monitoring:Status_stopped:synonyms:''
urn:SSLy:monitoring:Status_active:synonyms:''
urn:SSLy:monitoring:Status_disrupted:synonyms:''
urn:SSLy:monitoring:Status_disabled:synonyms:''
urn:SSLy:monitoring:Status_enabled:synonyms:''
urn:SSLy:monitoring:Status_malfunctioning:synonyms:''
urn:SSLy:monitoring:Device_work_status:synonyms:''
urn:SSLy:monitoring:Device_status_able_to_work:synonyms:''
urn:SSLy:monitoring:Device_Status_malfunctioning:synonyms:''
urn:SSLy:monitoring:Device_status_unable_to_work:synonyms:''
urn:SSLy:monitoring:Cause:synonyms:''
urn:SSLy:monitoring:Trust_status:synonyms:''
urn:SSLy:monitoring:Trust_status_pending_approval:synonyms:''
urn:SSLy:monitoring:Trust_status_approved:synonyms:''
urn:SSLy:monitoring:Trust_status_untrusted:synonyms:''
urn:SSLy:monitoring:Trust_status_unreliable:synonyms:''
urn:SSLy:monitoring:Trust_status_compromised:synonyms:''
urn:SSLy:monitoring:Alarm:synonyms:''
urn:SSLy:monitoring:Origin_data_type:synonyms:''
urn:SSLy:monitoring:Origin_type_actual:synonyms:''
urn:SSLy:monitoring:Origin_type_predicted:synonyms:''
urn:SSLy:monitoring:Origin_data_simulated:synonyms:''
urn:SSLy:monitoring:Warning threshold:synonyms:''
urn:SSLy:monitoring:Alarm Threshold:synonyms:''
urn:SSLy:facilities:Facility_type:synonyms:''
urn:SSLy:facilities:Facility_type_Hotel:synonyms:''
urn:SSLy:facilities:Facility_type_Shelter:synonyms:''
urn:SSLy:facilities:Facility_type_Hospital:synonyms:''
urn:SSLy:facilities:Facility_type_Clinic:synonyms:''
urn:SSLy:facilities:Facility_type_Theater:synonyms:''
urn:SSLy:facilities:Facility_type_Stadium:synonyms:''
urn:SSLy:facilities:Facility_type_Warehouse:synonyms:''

urn:SSLy:facilities:Facility_type_Police_Station:synonyms:''
urn:SSLy:facilities:Facility_type_Firefighter_Station:synonyms:''
urn:SSLy:facilities:Facility_type_Military_quarters:synonyms:''
urn:SSLy:facilities:Facility_type_Electric_Power_Plant:synonyms:''
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Wind_Turbine:synonyms:''
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Photovoltaic:synonyms:''
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Gas Plant:synonyms:''
urn:SSLy:facilities:Facility_type_Electric_Power_Plant/Fuel Plant:synonyms:''
urn:SSLy:facilities:Facility_type_Oil_Refinery:synonyms:''
urn:SSLy:facilities:Facility_type_Oil_Store:synonyms:''
urn:SSLy:facilities:Facility_type_Transmissions_Towe:synonyms:''
urn:SSLy:facilities:Facility_type_Electricity_Transport_Line:synonyms:''
urn:SSLy:facilities:Facility_type_Oil_Pipeline:synonyms:''
urn:SSLy:facilities:Facility_type_Gas_Pipeline:synonyms:''
urn:SSLy:facilities:Facility_type_Inland_Waterways:synonyms:''
urn:SSLy:facilities:Facility_type_Water_Processing_Plant:synonyms:''
urn:SSLy:facilities:Facility_type_Deaslination_Plant:synonyms:''
urn:SSLy:facilities:Facility_type_Dam:synonyms:''
urn:SSLy:facilities:Facility_type_Care_Home:synonyms:''
urn:SSLy:facilities:Facility_type_School:synonyms:''
urn:SSLy:facilities:Facility_type_Prison:synonyms:''
urn:SSLy:facilities:Facility_type_Young_Offenders_Institute:synonyms:''
urn:SSLy:facilities:Facility_type_Orphanage:synonyms:''
urn:SSLy:facilities:Facility_type_Road:synonyms:''
urn:SSLy:facilities:Facility_type_Road/Highway:synonyms:''
urn:SSLy:facilities:Facility_type_Train_Station:synonyms:''
urn:SSLy:facilities:Facility_type_Airport:synonyms:''
urn:SSLy:facilities:Facility_type_Bridge:synonyms:''
urn:SSLy:facilities:Total_Capacity:synonyms:''
urn:SSLy:facilities:Total_Capacity_Units:synonyms:''
urn:SSLy:facilities:Current_availability:synonyms:''
urn:SSLy:facilities:Operational_status:synonyms:''
urn:SSLy:facilities:Operational_status_Decomissioned:synonyms:''
urn:SSLy:facilities:Operational_status_idle:synonyms:''
urn:SSLy:facilities:Operational_status_Non-operational:synonyms:''
urn:SSLy:facilities:Operational_status_Partially_Operational:synonyms:''

urn:SSLy:facilities:Operational_status_Fully_operational:synonyms:''
urn:SSLy:facilities:Can_cause_when_working:synonyms:''
urn:SSLy:facilities:Can_cause_when_idle:synonyms:''
urn:SSLy:facilities:Possible_threat_cases:synonyms:''
urn:SSLy:facilities:Invaluable_assets:synonyms:''
urn:SSLy:facilities:Cultural_Importance:synonyms:''
urn:SSLy:facilities:Use:synonyms:''
urn:SSLy:facilities:Construction_year:synonyms:''
urn:SSLy:facilities:Last_Renovation_Year:synonyms:''
urn:SSLy:facilities:Construction_material:synonyms:''
urn:SSLy:facilities:Construction_material_Reinforced_Concrete:synonyms:''
urn:SSLy:facilities:Construction_material_Masonry:synonyms:''
urn:SSLy:facilities:Construction_material_Steel:synonyms:''
urn:SSLy:facilities:Construction_material_Timber:synonyms:''
urn:SSLy:facilities:Construction_material_Pre-cast_Concrete:synonyms:''
urn:SSLy:facilities:Construction_material_Other:synonyms:''
urn:SSLy:facilities:accuracy_year_construction:synonyms:''
urn:SSLy:facilities:Number_floors_on_ground:synonyms:''
urn:SSLy:facilities:Number_Basements:synonyms:''
urn:SSLy:facilities:Number_Building_Occupants:synonyms:''
urn:SSLy:facilities:Sensitivity_Issues:synonyms:''
urn:SSLy:facilities:Disable_Access_Means:synonyms:''
urn:SSLy:damage_assessment:building_code:synonyms:''
urn:SSLy:damage_assessment:Damage_Cause:synonyms:''
urn:SSLy:damage_assessment:Damage_Type:synonyms:''
urn:SSLy:damage_assessment:Damage_Level:synonyms:''
urn:SSLy:damage_assessment:Damage_Type:synonyms:''
urn:SSLy:damage_assessment:Damage_Floor:synonyms:''
urn:SSLy:transport_means:Transport_Mean:synonyms:''
urn:SSLy::Transport_Mean_train:synonyms:''
urn:SSLy::Transport_Mean_Airplane:synonyms:''
urn:SSLy::Transport_Mean_Oil_Tanker:synonyms:''
urn:SSLy::Transport_Mean_Gas_Tanker:synonyms:''
urn:SSLy::Transport_Mean_Cargo_Ship:synonyms:''
urn:SSLy::Transport_Mean_Hospital_Ship:synonyms:''
urn:SSLy::Transport_Mean_Ocean_Liner:synonyms:''

urn:SSLy::Transport_Mean_Bus:synonyms:''
urn:SSLy::Transport_Mean_Truck:synonyms:''
urn:SSLy::Transport_Mean_Ambulance:synonyms:''
urn:SSLy::Is_Public_Transport:synonyms:''
urn:SSLy::Can_Carry_People:synonyms:''
urn:SSLy:other:Compound:synonyms:''
urn:SSLy:other:Agent_type:synonyms:''
urn:SSLy:other:Chem_spectrum_list:synonyms:''
urn:SSLy:other:Pollutant:synonyms:''
urn:SSLy:other:Video_stream:synonyms:''
urn:SSLy:other:Audio_stream:synonyms:''
urn:SSLy:other:Video_file:synonyms:''
urn:SSLy:other:Audio_file:synonyms:''
urn:SSLy:other:Region_name:synonyms:''
urn:SSLy:other:Population_name:synonyms:''
urn:SSLy:other:Number_inhabitants:synonyms:''
urn:SSLy:other:Sensor_message:synonyms:'sensor payload, sensor measurement'
urn:SSLy:other:Event_Nature:synonyms:'Event type'
urn:SSLy:other:Event_Nature_Chemical:synonyms:''
urn:SSLy:other:Event_Nature_Biological:synonyms:''
urn:SSLy:other:Event_Nature_Radiological:synonyms:''
urn:SSLy:other:Event_Nature_Nuclear:synonyms:''
urn:SSLy:other:Event_Nature_Explossive:synonyms:''
urn:SSLy:other:Event_Nature_Natural:synonyms:''

D.3 URNs for the descriptions of the field names

urn:SSLy:General:Plane_angle:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Solid_angle:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Frequency:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Activity_radionuclide:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Absorbed_dose:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Close_equivalent:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Catalytic_activity:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Force:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Pressure:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Power:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Energy:description:'As stated in EN ISO 80000-1:2022'

urn:SSLy:General:Celsius_temperature:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Electric_charge:description:'As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Magnetic_flux:description:'(Deprecated) As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Magnetic_flux_density:description:'(Deprecated) As stated in EN ISO 80000-1:2022'
urn:SSLy:General:Capacitance:description:'As stated in EN ISO 80000-1:2022'
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urn:SSLy:General:Illuminance:description:'As stated in EN ISO 80000-1:2022'
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urn:SSLy:Thermodynamics:Heat:description:'As stated in EN ISO-8000:5:2019'

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urn:SSLy:Thermodynamics:Specific_heat_capacity_at_saturated_vapour_pressure:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Ratio_specific_heat_capacities:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Isentropic_exponent:description:'As stated in EN ISO-8000:5:2019'

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urn:SSLy:Thermodynamics:Internal_Energy,_thermodynamic_energy:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Enthalpy:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Helmboltz_energy:description:'As stated in EN ISO-8000:5:2019'

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urn:SSLy:Thermodynamics:Specific_Helmholtz_energy:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Specific_Gibbs_energy:description:'As stated in EN ISO-8000:5:2019'

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urn:SSLy:Thermodynamics:Planck_function:description:'As stated in EN ISO-8000:5:2019'

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urn:SSLy:Thermodynamics:Mass_concentration_water_vapour:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Mass_ratio_water_to_dry_matter:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Mass_ratio_water_vapour_to_dry_gas:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Mass_fraction_water:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Mass_fraction_dry_matter:description:'As stated in EN ISO-8000:5:2019'

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urn:SSLy:Thermodynamics:Relative_mass_concentration_vapour:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Relative_mass_ratio_vapour:description:'As stated in EN ISO-8000:5:2019'

urn:SSLy:Thermodynamics:Dew-point_temperature:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric current:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Elementary_charge:description:'As stated in IEC 80000-6:2023'

urn:SSLy:Electromagnetism:Electric_charge_density:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Surface_density_electric_charge:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Linear_density_electric_charge:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric_dipole_moment:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric_polarization:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric_current_density:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Linear_electric_current_density:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric_field_strength:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Voltage:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Induced_voltage:description:'As stated in IEC 80000-6:2023'

urn:SSLy:Electromagnetism:Electric_flux_density:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Permittivity:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Relative_permittivity:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric_susceptibility:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric_flux:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Displacement_current_density:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Magnetic_flux:description:'As stated in IEC 80000-6:2023'

urn:SSLy:Electromagnetism:Total_magnetic_flux:description:'As stated in IEC 80000-6:2024'

urn:SSLy:Electromagnetism:Magnetic_moment:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Magnetization:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Magnetic_field_strength:description:'(Deprecated) As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Magnetic_polarization:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Magnetic_dipole_moment:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Leakage_factor:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Resistivity:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Resistance:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Phase_difference:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Electric_current_phasor:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Voltage_phasor:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:impedance_vacuum:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:wave_impedance_in_vacuum:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Electromagnetism:Resistance_to_alternating_current:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:admittance_vacuum:description:'As stated in IEC 80000-6:2022'

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urn:SSLy:Electromagnetism:Active_energy:description:'As stated in IEC 80000-6:2022'

urn:SSLy:Light:Speed_light_in_medium:description:'As stated in ISO 80000-7:2019'

urn:SSLy:Light:Refractive_index:description:'As stated in ISO 80000-7:2019'

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urn:SSLy:Light:Spectral_radiant_energy_density_terms_wavelength:description:'Spectral radiant energy density in terms of wavelength'

urn:SSLy:Light:Spectral_radiant_energy_density_terms_wavenumber:description:'Spectral radiant energy density in terms of wavenumber'

urn:SSLy:Light:Radiant_flux,_radiant_power:description:'As stated in ISO 80000-7:2019'

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urn:SSLy:Light:Radiant_exitance_(deprecated):description:'As stated in ISO 80000-7:2019'

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urn:SSLy:Atomic_nuclear_phys:Absorbed_dose:description:'As stated in EN ISO-80000-10:2019'

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urn:SSLy:Condensed_matter_phys:Fundamental_reciprocal_lattice_vectors:description:'As stated in EN ISO-80000-12:2019'

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urn:SSLy:Condensed_matter_phys:Mean_free_path_photons:description:'As stated in EN ISO-80000-12:2019'

urn:SSLy:Condensed_matter_phys:Mean_free_path_electrons:description:'As stated in EN ISO-80000-12:2019'

urn:SSLy:Condensed_matter_phys:Energy_density_states:description:'As stated in EN ISO-80000-12:2019'

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urn:SSLy:Condensed_matter_phys:Superconductor_transition_temperature:description:'As stated in EN ISO-80000-12:2019'

urn:SSLy:Condensed_matter_phys:Thermodynamic_critical_magnetic_flux_density:description:'As stated in EN ISO-80000-12:2019'

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urn:SSLy:Condensed_matter_phys:Upper_critical_magnetic_flux_density:description:'As stated in EN ISO-80000-12:2019'

urn:SSLy:Condensed_matter_phys:Superconductor_energy_gap:description:'As stated in EN ISO-80000-12:2019'

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urn:SSLy:info_science_tech:Loss_probability:description:'As stated in EN 80000-13:2008'

urn:SSLy:info_science_tech:Waiting_probability:description:'As stated in EN 80000-13:2008'

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urn:SSLy:info_science_tech:Transfer_rate:description:'As stated in EN 80000-13:2008'

urn:SSLy:info_science_tech:Period_data_elements:description:'As stated in EN 80000-13:2008'

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urn:SSLy:info_science_tech:Carrier_power:description:'As stated in EN 80000-13:2008'

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urn:SSLy:info_science_tech:Error_probability:description:'As stated in EN 80000-13:2008'

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urn:SSLy:info_science_tech:Information_entropy:description:'Same as "Entropy", as stated in ISO-80000-23:2008'

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urn:SSLy:info_science_tech:Relative_redundancy:description:'As stated in EN 80000-13:2008'

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urn:SSLy:info_science_tech:Irrelevance:description:'As stated in EN 80000-13:2008'

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urn:SSLy:info_science_tech:Channel_time_capacity:description:'As stated in EN 80000-13:2008'

urn:SSLy:monitoring:Operational_status:description:'the status of a device that is being monitored (not to be confused with the status of the sensor that is monitoring the device)'

urn:SSLy:monitoring:Status_not_started:description:'the device has not been started yet.'

urn:SSLy:monitoring:Status_stopped:description:'the device is stopped'

urn:SSLy:monitoring:Status_active:description:'the device is started and working properly'

urn:SSLy:monitoring:Status_disrupted:description:'the device is not working due to an external undesired condition'

urn:SSLy:monitoring:Status_disabled:description:'the device is stopped and compelled to not start till it is enabled again'

urn:SSLy:monitoring:Status_enabled:description:'the device is allowed to try to start when it receives an order to do so'

urn:SSLy:monitoring:Status_malfunctioning:description:'the device is working, but it is not able to comply with its operational specifications. Note that this does not necessarily mean that the measurements are unreliable'

urn:SSLy:monitoring:Device_work_status:description:'states whether the device is working or not, and whether it is working according to its operational specifications'

urn:SSLy:monitoring:Device_status_able_to_work:description:'the device is able to work according to its operational specifications'

urn:SSLy:monitoring:Device_Status_malfunctioning:description:'the device is working, but it is not able to comply with its operational specifications. Note that this does not necessarily mean that the measurements are unreliable'

urn:SSLy:monitoring:Device_status_unable_to_work:description:'the device cannot work at all'

urn:SSLy:monitoring:Cause:description:'reason why a device is not working properly or for an incidence'

urn:SSLy:monitoring:Trust_status:description:'Status of trust of the device, not to be confused with the status of trust of a given measurement or reported value'

urn:SSLy:monitoring:Trust_status_pending_approval:description:'The system received a request for adding this sensor and its approval is still pending'

urn:SSLy:monitoring:Trust_status_approved:description:'The sensor is approved and currently trusted'

urn:SSLy:monitoring:Trust_status_untrusted:description:'The system received a request for adding this sensor but now it is not trusted yet, regardless the request was originally rejected or due to have passed through a state of compromised'

urn:SSLy:monitoring:Trust_status_unreliable:description:'the measurements provided by the device are no longer considered to be reliable. Note that this may not necessarily be due to the device having been compromised'

urn:SSLy:monitoring:Trust_status_compromised:description:'the sensor is believed to have been compromised by an external party. Note that the fact that a sensor has been compromised does not necessarily mean that it must be automatically put in the state of not trusted'

urn:SSLy:monitoring:Alarm:description:'Intelligent sensors may use this field to indicate whether a measurement from a sensor should trigger an alarm or not'

urn:SSLy:monitoring:Origin_data_type:description:'States whether the data is actual, predicted or simulated'

urn:SSLy:monitoring:Origin_type_actual:description:'value for origin_type corresponding to actual data'

urn:SSLy:monitoring:Origin_type_predicted:description:'value for origin_type corresponding to predicted data'

urn:SSLy:monitoring:Origin_data_simulated:description:'States whether the data is actual, predicted or simulated'

urn:SSLy:monitoring:Warning threshold:description:'Indicates the value to decide whether to trigger a warning for somebody to evaluate the actions to be taken'

urn:SSLy:monitoring:Alarm Threshold:description:'Indicates the value to decide whether to trigger an alarm to implement actions to deal immediately with the situation'

urn:SSLy:facilities:Facility_type:description:'Type of facility'

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urn:SSLy:facilities:Facility_type_Shelter:description:'Value for type of facility Shelter.'

urn:SSLy:facilities:Facility_type_Hospital:description:'Value for type facility Hospital'

urn:SSLy:facilities:Facility_type_Clinic:description:'Value for type facility Clinic'

urn:SSLy:facilities:Facility_type_Theater:description:'Value for type facility Theater'

urn:SSLy:facilities:Facility_type_Stadium:description:'Value for type facility Stadium'

urn:SSLy:facilities:Facility_type_Warehouse:description:'Value for type facility Warehouse'

urn:SSLy:facilities:Facility_type_Police_Station:description:'Value for type facility Police Station'

urn:SSLy:facilities:Facility_type_Firefighter_Station:description:'Value for type facility Firefighter station'

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urn:SSLy:facilities:Facility_type_Airport:description:'Value for type of facility airport'

urn:SSLy:facilities:Facility_type_Bridge:description:' Value for type of facility bridge'

urn:SSLy:facilities:Total_Capacity:description:'Total capacity of a facility'

urn:SSLy:facilities:Total_Capacity_Units:description:'Units in which the total capacity are expressed'

urn:SSLy:facilities:Current_availability:description:'current number of available resources indicated in the units given by the field units'

urn:SSLy:facilities:Operational_status:description:'Operational status of the capacity'

urn:SSLy:facilities:Operational_status_Decomissioned:description:'Value for operational status of capacities that indicate that the capacity was decommissioned and has not been maintained but it could potentially work again if proper staff and maintenance was provided '

urn:SSLy:facilities:Operational_status_idle:description:'Value for operational status of capacities that indicates that the capacity is ready to work but currently idle'

urn:SSLy:facilities:Operational_status_Non-operational:description:'Value for operational status of capacities that indicates that the facility has not been decommissioned but is currently not able to operate'

urn:SSLy:facilities:Operational_status_Partially_Operational:description:'Value for operational status of capacities that indicates that rhe facility is currently operating but cannot perform at its maximum _Fcapacity'

urn:SSLy:facilities:Operational_status_Fully_operational:description:'Value for operational status of capacities that indicates that the facility is currently operating and can perform at its maximum capacity'

urn:SSLy:facilities:Can_cause_when_working:description:'List of threats that can be caused by the facility if is compromised when it is working. Values to be taken from EDXL-CAP list of types of emergencies'

urn:SSLy:facilities:Can_cause_when_idle:description:'List of threats that can be caused by the facility it is compromised. Values to be taken from EDXL-CAP list of types of emergencies'

urn:SSLy:facilities:Possible_threat_cases:description:'List of threats that can cause that the facility gets compromised and cause any of the threats stated in the 'Can cause' lists'

urn:SSLy:facilities:Invaluable_assets:description:'list of invaluable assets, such as historic artworks that are considered worth to be protected and inside the facility'

urn:SSLy:facilities:Cultural_Importance:description:'Description of the importance of the facility or its contents'

urn:SSLy:facilities:Use:description:'Use of the facility'

urn:SSLy:facilities:Construction_year:description:'The year that the facility was constructed'

urn:SSLy:facilities:Last_Renovation_Year:description:'The last year of structural renovation of the facility'

urn:SSLy:facilities:Construction_material:description:'A list of materials used in the construction of the facility'

urn:SSLy:facilities:Construction_material_Reinforced_Concrete:description:'Value for construction material Reinforced Concrete'

urn:SSLy:facilities:Construction_material_Masonry:description:'Value for construction material Masonry'

urn:SSLy:facilities:Construction_material_Steel:description:'Value for construction material Steel'

urn:SSLy:facilities:Construction_material_Timber:description:'Value for construction material Timber'

urn:SSLy:facilities:Construction_material_Pre-cast_Concrete:description:'Value for construction material Pre-cast Concrete'

urn:SSLy:facilities:Construction_material_Other:description:'Value for construction material Other'

urn:SSLy:facilities:accuracy_year_construction:description:'Can be either ‘Exact’ or ‘Approximate’'

urn:SSLy:facilities:Number_floors_on_ground:description:'Number of floors over the ground'

urn:SSLy:facilities:Number_Basements:description:'Number of Bsaements of the facility'

urn:SSLy:facilities:Number_Building_Occupants:description:'Number of people present in the facility'

urn:SSLy:facilities:Sensitivity_Issues:description:'ist of sensitivity issues that might be associated with the facility'

urn:SSLy:facilities:Disable_Access_Means:description:'List of access means to ease access to the facility for the disabled people, such as ramps or adapted elevators, or none to indicate that no special mean is provided'

urn:SSLy:damage_assessment:building_code:description:'A unique identifier of the asset'

urn:SSLy:damage_assessment:Damage_Cause:description:'Cause of the damage to the building as stated in any of the following urls: https://www.emdat.be/ https://www.desinventar.net/ https://inspire.ec.europa.eu/ https://www.start.umd.edu/gtd/ https://emergency.copernicus.eu/mapping/list-of-activations-risk-and-recovery'

urn:SSLy:damage_assessment:Damage_Type:description:'Free text indicating hte damage'

urn:SSLy:damage_assessment:Damage_Level:description:'Level of damage suffered by the asset. It can be one of the followingshall follow the structure <damage level classification>/<damage level> where <damage level classification> shall be the name of a classification of damage level and <damage level> shall be the level of damage expressed as one of the values stated in the damage level classification'

urn:SSLy:damage_assessment:Damage_Type:description:'a free text indicating the type of damage'

urn:SSLy:damage_assessment:Damage_Floor:description:'Number of the floor of the damage inside the asset. Applicable only to assets of type facility'

urn:SSLy:transport_means:Transport_Mean:description:'type of transport'

urn:SSLy::Transport_Mean_train:description:'Value for specific type of transport mean train'

urn:SSLy::Transport_Mean_Airplane:description:'Value for specific type of transport mean airplane'

urn:SSLy::Transport_Mean_Oil_Tanker:description:'Value for specific type of transport mean oil tanker'

urn:SSLy::Transport_Mean_Gas_Tanker:description:'Value for specific type of transport mean gas tanker'

urn:SSLy::Transport_Mean_Cargo_Ship:description:'Value for specific type of transport mean cargo ship'

urn:SSLy::Transport_Mean_Hospital_Ship:description:'Value for specific type of transport mean hospital ship'

urn:SSLy::Transport_Mean_Ocean_Liner:description:'Value for specific type of transport mean ocean liner'

urn:SSLy::Transport_Mean_Bus:description:'Value for specific type of transport mean bus'

urn:SSLy::Transport_Mean_Truck:description:'Value for specific type of transport mean truck'

urn:SSLy::Transport_Mean_Ambulance:description:'Value for type for specific type of transport mean ambulance'

urn:SSLy::Is_Public_Transport:description:'A Boolean value indicating whether the transport mean corresponds to a public transport'

urn:SSLy::Can_Carry_People:description:'A Boolean value indicating whether the transport mean can carry people'

urn:SSLy:other:Compound:description:'Chemical compound detected by the sensor'

urn:SSLy:other:Agent_type:description:'The type of the agent measured, not to be confused with the compound which is the specific agent'

urn:SSLy:other:Chem_spectrum_list:description:'A list of chemical compounds obtained from a measurement'

urn:SSLy:other:Pollutant:description:'the name of a particle, gas, vapour or chemical compound that is present in some physical medium and is polluting it'

urn:SSLy:other:Video_stream:description:'a continuous and potentially open stream of binary data representing a video content'

urn:SSLy:other:Audio_stream:description:'a continuous stream of binary data representing an audio content'

urn:SSLy:other:Video_file:description:'a file containing data representing video content, but it may additionally contain audio content synchronized with the video content'

urn:SSLy:other:Audio_file:description:'a file containing data representing audio content'

urn:SSLy:other:Region_name:description:'the name of a region, district, state or county that the data provided refers to'

urn:SSLy:other:Population_name:description:'the name of the city, town, village or settlement that the data provided refers to'

urn:SSLy:other:Number_inhabitants:description:'number of inhabitants of the corresponding population as stated in population name'

urn:SSLy:other:Sensor_message:description:'Message of a sensor in its own native format'

urn:SSLy:other:Event_Nature:description:'Nature of the event'

urn:SSLy:other:Event_Nature_Chemical:description:'Type of event nature chemical'

urn:SSLy:other:Event_Nature_Biological:description:'Type of event nature biological'

urn:SSLy:other:Event_Nature_Radiological:description:'Type of event nature radiological'

urn:SSLy:other:Event_Nature_Nuclear:description:'Type of event nature nuclear'

urn:SSLy:other:Event_Nature_Explossive:description:'Type of event nature explossive'

urn:SSLy:other:Event_Nature_Natural:description:'Type of event nature natural'

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