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Inteligentni transportni sistemi - Seznam grafičnih simbolov - 1. del: Specifikacija (ISO/DIS 14823-1:2022)

Intelligent transport systems - Graphic data dictionary - Part 1: Specification (ISO/DIS 14823-1:2022)

Intelligente Verkehrssysteme - Graphisches Verzeichnis - Teil 1: Spezifikation (ISO/DIS 14823-1:2022)

Systèmes de transport intelligents - Dictionnaire de données graphiques - Partie 1: Spécification (ISO/DIS 14823-1:2022)

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Intelligent transport systems — Graphic data dictionary —

Part 1: Specification

Systèmes de transport intelligents — Dictionnaire de données graphiques —

Partie 1: Spécification

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Foreword

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

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

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

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

The second edition of Graphic Data Dictionary has been developed by introducing the mechanism of RELATIVE OBJECT IDENTIFIER specified in 7.3.

In addition to that, the following changes also have been made.

- Deletion of redundant pictogram codes
- Addition of new pictogram codes requested by some countries
- Addition of new attributes to copy with new signs
- Deletion of redundant attributes
- Changes of existing attributes to be more flexible and to be harmonized with existing standards.

Introduction

0.1 Design principle

This document specifies a Graphic Data Dictionary (GDD) that has been developed with the intent of creating a common basis for transmitting encoded information for existing road traffic signs and pictograms. The coding system has been developed to be language independent, such that data that can be interpreted, irrespective of language or regional differences. It supports Intelligent Transport System (ITS) application such as in-vehicle signage or in-vehicle information.

This document supports

- the efficient IT-centric encoding for ITS messaging to represent specific road traffic signs and pictograms, and
- the consistent decoding of encoded road traffic signs and pictogram data for display in ITS.

This document can support the translation of signs and pictograms with a similar purpose from the representation used in one country to the representation used in another country.

0.2 Background of revision

The first edition of Graphic Data Dictionary was published in 2017.

This first edition used the country code stipulated by ISO 3166-1 to distinguish the country where Graphic Data Dictionary is provided and used the following numbering structure to identify the pictogram codes stipulated in the 8.

- The two-digit category of the sign
- The one-digit nature of the sign
- The two-digit serial number of the sign

However, this mechanism lacked a global identification of pictogram codes and a flexibility when adding new pictogram codes.

To cope with these issues, the second edition of Graphic Data Dictionary has been developed.

0.3 Backward compatibility

The second edition of Graphic Data Dictionary has been developed to be backward compatible with the first edition of the Graphic Data Dictionary to assist in transitions from earlier implementations, while not hindering spreads of the first edition of Graphic Data Dictionary and being able to support many new features.

Specifically, the Graphic Data Dictionary allows the selection of 2 versions described in 7.1.

The Graphic Data Dictionary allows to use both the ASN.1 description specified in Annex A for the second version and in Annex E for the first version, and both the attributes specified in Annex B for the second version and in Annex F for the first version.

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Intelligent transport systems — Graphic data dictionary

1 Scope

This document specifies a graphic data dictionary, a system of standardised codes for existing road traffic signs and pictograms used to deliver Traffic and Traveller Information (TTI). The coding system can be used in the formation of messages within intelligent transport systems.

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.

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 8824-1:2015, *Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ISO 3166-1:2020, *Codes for the representation of names of countries and their subdivisions — Part 1: Country code*

ISO/IEC 19505-1:2012, *Information technology — Object Management Group Unified Modeling Language (OMG UML) — Part 1: Infrastructure*

ISO/IEC 8859-1:1998, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 9834-1:2012, *Information technology — Procedures for the operation of object identifier registration authorities: General procedures and top arcs of the international object identifier tree — Part 1*

ISO/IEC 8825-5:2021, *Information technology – ASN.1 encoding rules: Mapping W3C XML schema definitions into ASN.1*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 Attribute

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coded information which can be associated to a pictogram (3.4) in order to clarify the meaning of the pictogram

3.2**country code**

internationally recognised codes stipulated by ISO 3166-1 when referring to countries and subdivisions of countries

3.3**graphic data dictionary**

catalogue of codes for *pictograms* (3.4) organised systematically

3.4**pictogram**

graphic or icon on static signs or rendered on a display of IT system, such as a monitor or a VMS pictogram display, to inform travellers of information such as road conditions, traffic elements, traffic regulations or public facilities

3.5**pictogram category code**

codes assigned to the more detailed category of a *pictogram* (3.4) type under the service category

3.6**qualifier**

parameter for an *attribute* (3.1) used to express the meaning of *pictogram* (3.4) quantitatively

3.7**relative object identifier**

value which identifies an object by its position relative to some known object identifier [ISO/IEC 8824-1:2021]

3.8**service category code**

codes assigned to distinguish the service category such as a regulation or public facilities

3.9**specialization**

relationship between a more general class (the parent) and a more specific class (the child) that is fully consistent with the general class and that adds additional information [SOURCE: 11179-3:2013, notes removed]

4 Abbreviated terms

ASN.1	Abstract Syntax Notation One
ITS	Intelligent Transport Systems
IT	Information Technology
OID	Object identifier
UML	Unified Modeling Language
U.N.	United Nations
VMS	Variable Message Sign

5 Conformance

An implementation is conformant with this document when the following conditions are met.

- The implementation and transmission of graphic data shall comply with requirements listed in this document.
- The pictogram code shall be selected from the categorized codes listed in this document.

6 Requirements

The intended usage of this document is to support the efficient IT-centric encoding for ITS messaging to represent specific road traffic signs and pictograms and the consistent decoding of encoded road traffic signs and pictogram data for display in ITS.

This document supports the translation of pictograms with similar purpose from the representation used in one country to the representation used in another country. For illustrative purposes, it is foreseen that this document can be used to encode information concerning a specific pictogram that is then embedded into other information to be exchanged; if needed, on receipt of this information, the receiver can use the contents of this document to decode the information concerning the specific pictogram to support display across a range of dissemination systems. Examples of these dissemination systems may include: Traffic Control Centre system user interfaces; Variable Message Signs; Public Access Terminals; mobile personal information systems; and, on-board units.

Requirements for ITS applications which utilize the Graphic Data Dictionary are as follows.

- Graphic data shall consist of a version number, relative object identifier or country code, and optionally Attribute indicator.
- Category code shall be decided based on Table 1.
- Warning pictogram code shall be selected from Table 2.
- Regulatory pictogram code shall be selected from Table 3.
- Guide pictogram code shall be selected from Table 4.
- Public facilities pictogram code shall be selected from Table 5.
- Supplementary panel and additional panel pictogram code shall be selected from Table 6.
- Integer value which indicate the direction shall be determined based on Table B.3 or D.3.
- If Attribute indicator is on, graphic data shall include attributes listed in Table B.1 or D.1.
- When transmitting Graphic data, it shall be coded based on the ASN.1 module specified in Annex A or on the ASN.1 module specified in Annex E.

NOTE For transmission efficiency purposes, compression can be considered. This is outside the scope of this document.

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7 Structure of Graphic Data Dictionary

7.1 General

The Graphic Data Dictionary provides a taxonomy of all registered sign types by assigning each sign type with a globally unique category code. This category code allows the meaning of virtually any sign used for surface transport to be adequately conveyed in a language independent manner with a very short identifier coupled with optional attributes.

There are 2 versions when determining the structure of the Graphic Data Dictionary.

The first one uses the sequence of the country code and category code as specified by the GddStructure in Annex E.

This version is expected to be used mainly when expanding or maintaining the existing C-ITS applications which presently use GDD edition 1 (ISO 14823:2017).

The second one uses the object identifier of the category code by using the ASN.1 RELATIVE OID specified in 7.3. This mechanism has been introduced to cope with a global identification of pictogram codes and a flexibility when adding new pictogram codes.

In addition, some of the elements have been harmonised with DATEX II to be used in VMS signs.

It is up to each application or service to define how to use these versions.

However, for reasons of facilitating implementations, it is recommended to avoid mixing versions in the same applications or service.

Details of version 2 can be found in the Annex A, B, C and D while details of version 1 can be found in the Annex E, F and G.

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7.2 Current and deprecated signs

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There are a number of signs in the previous edition of ISO 14823: 2017 that are deprecated (no longer relevant or duplicated). Each sign code in this edition of the GDD is labelled “current” or “deprecated” together with a date of revision. Using this labelling enables legacy applications to continue to use these deprecated sign codes but signals to new users that it is wise to use only current labelled codes. To ensure backward compatibility no code is reused, so that if a deprecated code is transmitted and the receiver does not recognise it no action is taken. In the future it is possible that some codes might be set to “obsolete”.

7.3 Relative object identifier

International object identifier tree is a tree whose root corresponds to this Recommendation or International Standard and whose nodes correspond to Registration Authorities responsible for allocating arcs from a parent node.

The pictogram codes are registered on the international object identifier tree under the arc { joint-iso-itu-t(2) its(28) gdd(5) }. The first three sub-arcs follow the numbering structure:

- The two-digit service category of the sign
- The one-digit nature category of the sign
- The two-digit serial number of the sign

The taxonomy defined by the Graphic Data Dictionary allows maximum interoperability among implementations that might differ in their level of support of GDD details. In other words, while the GDD has been designed to support numerous potential use cases that require various levels of detail and virtually all sign types that might be encountered within surface transport, GDD has also been designed to accommodate applications (especially receiving applications) that might not support the full scope of the GDD. Specifically, the taxonomic structure of GDD allows a sender to provide a very detailed category code; if the receiver does not understand the complete taxonomic sequence, it should still be able to classify the sign under a parent category (or understand that it is safe to ignore).

For example, if a receiving application is notified of a sign with an object identifier of { joint(2) its(28) gdd(5) warning(11) warning3(3) wildAnimal(63) unspecified(0) au(36) kangaroo(x) }, it might be able to display the intended Australian-specific kangaroo crossing warning sign to the driver. Another application might generalize all object identifiers starting with { joint(2) its(28) gdd(5) warning(11) warning3(3) wildAnimal(63) } sign to a generic wild animal crossing sign. And another application might generalize all object identifiers starting with { joint(2) its(28) gdd(5) warning(11) } to be a generic warning sign. The level of detail supported by an application is dependent upon the purpose of the receiving application and is beyond the scope of the GDD.

To ensure that all signs described by the GDD are placed into this taxonomy, the GDD conveys the object identifier of the category code by using the ASN.1 RELATIVE OID type with a root node of { joint(2) its(28) gdd(5) }. This allows a more efficient encoding of the object identifier while also ensuring that all codes can be generalized according to the defined taxonomy. This structure still allows for further regional specializations of the category codes defined within this standard according to the process defined in Annex D.

7.4 Country code

ISO 3166-1 is used to encode the countryCode in GddStructure.pictogramCode using two-letter codes in uppercase in ISO/IEC 8859-1 encoding. For example, if the on-board unit has multiple countries' pictograms, it can render pictogram on the display in accordance to each country code when the traveller driving through adjacent countries.

7.5 Pictogram code and OID node information

Category code consists of a service category code and a pictogram category code. Service category has following four types of categories:

- Traffic signs are officially established pictograms in each country to control traffic using warning, regulatory or informative sign.
- Public facilities indicate the existence of certain public facilities and their service details (e.g. toilets, restaurants, first aid facilities, etc.).
- Ambient conditions indicate weather condition on the road (e.g. rainfall, flood, fog, etc) and road conditions (traffic congestion, accident, etc) which may effect the traffic flow.
- Supplemental panels are attached to the main signs to provide supplemental information using text or numbers.

Pictograms to be used for information display may vary from country to country, political jurisdiction to political jurisdiction, or system operator to system operator.

Table 1 — Pictogram code and OID node information

Pictogram code and OID node information					
Service category code			Pictogram category code		
Category number and name	Sub category number and name	OID node number and mnemonic	Nature category number and name	OID node code and mnemonic	Serial number
1: Traffic sign	1: Danger warning	11: dangerWarning	1: Danger warning	1: warning1	1-99
			2: Danger warning	2: warning2	
			3: Danger warning	3: warning3	
	2: Regulatory	12: regulatory	1: Priority	1: priority1	
			4: Prohibition or restriction	4: prohibitionOrRestriction1	
			5: Prohibition or restriction	5: prohibitionOrRestriction2	
			6: Prohibition or restriction	6: prohibitionOrRestriction3	
			7: Mandatory	7: mandatory1	
			8: Mandatory	8: mandatory2	
			9: Mandatory	9: mandatory3	
	3: informative	13: informative	1: Advance direction	1: advanceDirection1	
			2: Advance direction	2: advanceDirection2	

			Advance direction	
			3: Advance direction	3: advanceDirection3
			4: Instruction	4 : instruction
			5: Notification	5: notification
			6: Lane guidance	6: laneGuidance
			7: Alert	7: alert
			8: Road/place identification	8: roadOrPlaceIdentification1
			9: Road/place identification	9: roadOrPlaceIdentification1
2: Public facilities	1: Public facilities	21: publicFacilities	1: Public facilities and services	1: publicFacilitiesAndServices1
			2: Public facilities and services	2: publicFacilitiesAndServices2
3: Ambient /road conditions	1: Ambient conditions	31: ambientConditions	1: Ambient conditions	1: ambientConditions1
			2: Ambient conditions	2: ambientConditions2
	2: road conditions	32: roadConditions	1: roadConditions	1: roadConditions1
4: Supplementary panel and	1: Supplementary panel and additional panel	41: supplementaryPanelAndAdditionalPanel	1: Supplementary panel and additional panel	1: supplementaryPanelAndAdditionalPanel1