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Intelligent transport systems — Graphic data dictionary

Systèmes de transport intelligents — Dictionnaire de données graphiques

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Foreword

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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).

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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*.

This first edition cancels and replaces ISO/TS 14823:2008, which has been technically revised.

Introduction

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.

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

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

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

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
code attached to the *pictogram* (3.4) in order to clarify the meaning of 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
sign or icon rendered on a display of IT system such as computer or VMS to inform travellers of information such as 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
service category code
codes assigned to distinguish the service category such as a regulation or public facilities

4 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.

5 Abbreviated terms

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

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 country code, category code, and optionally Attribute indicator.

— Category code shall be decided based on Table 1.

— 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.

— Ambient/road conditions pictogram code shall be selected from Table 6.

— Integer value which indicate the direction shall be determined based on Table B.3.

— If Attribute indicator is on, graphic data shall include attributes listed in Table B.1.

— When transmitting Graphic data, it shall be coded based on the ASN.1 code described in Annex A.

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

7 Structure of Graphic Data Dictionary

7.1 General

The Graphic Data Dictionary shall consist of country code, category code. The Graphic Data Dictionary supports the definition of optional attributes.

7.2 Country code

Country code stipulated by ISO 3166-1 is used to distinguish the country where Graphic Data Dictionary is provided, as the style of pictograms can be different in each country. For example, if the on-board unit has multiple countries' pictograms, it can render pictogram on the display in accordance to each county code when the traveller driving through adjacent countries.

7.3 Category code

7.3.1 Categorization policy

Category code consists of a service category code and a pictogram category code. Service category has following three types of categories: Traffic sign, Public facilities and Ambient/road conditions.

— Traffic signs are officially established pictograms in each country to control traffic using warning, regulatory or informative sign.

— Public facilities indicates the existence of certain public facilities and their service details (e.g. toilets, restaurants, first aid facilities, etc.).

— "Ambient/road condition" is concerned with the ambient condition of a roadway or local condition which may affect the flow of road traffic (such as bad weather and traffic congestion).

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 — Category code

Category code			
Service category code		**Pictogram category code**	
Category number	**Sub category number**	**Category number**	
1: Traffic sign	1: Danger warning	1–9: Danger warning	Serial number (1–99)
	2: Regulatory	1–3: Priority	
		4–6: Prohibition or restriction	
		7–9: Mandatory	
	3: Informative	1–3: Advance direction	
		4: Direction	
		6: Lane guidance	
		7–9: Road/place identification	
2: Public facilities	1: Public facilities	1–9: Public facilities and services	
3: Ambient/ road condition	1: Ambient condition	1–9: Ambient condition and nature	
	2: Road condition	1–9 Road condition and nature	

7.4 Data type of Graphic Data Dictionary

Data type of Graphic Data Dictionary shall be as follows:


```
GddStructure::= SEQUENCE{
   pictogramCode          SEQUENCE{
   countryCode               OCTET STRING (SIZE (2)) OPTIONAL,
   serviceCategoryCode       CHOICE {
      trafficSignPictogram    ENUMERATED {dangerWarning, regulatory, informative,...},
      publicFacilitiesPictogram   ENUMERATED {publicFacilities, ...},
      ambientOrRoadConditionPictogram   ENUMERATED {ambientCondition, roadCondition,...},
   ...},
   pictogramCategoryCode   SEQUENCE {
nature           INTEGER (1..9),
serialNumber     INTEGER (0..99)
}},
   attributes        GddAttributes OPTIONAL
}
GddAttributes::= SEQUENCE (SIZE(1..8),...) OF CHOICE{
   dtm International Sign-applicablePeriod, -- Date/Time/Period
   edt International Sign-exemptedApplicablePeriod,-- Exemption status of Date/Time/Period
   dfl International Sign-directionalFlowOfLane,-- Directional Flow of Lane
   ved International Sign-applicableVehicleDimensions,-- Vehicle Dimensions
   spe International Sign-speedLimits,-- Speed
   roi International Sign-rateOfIncline,-- Rate of Incline
   dbv International Sign-distanceBetweenVehicles,-- Distance Between Vehicles
   ddd International Sign-distinationInformation, -- Destination/Direction/Distance
set International Sign-section,-- Section
nol   International Sign-numberOfLane    --Number of Lanes
   }
```

Details of GddAttributes are described in Annex B.

8 Numbering of category code

8.1 General

The Graphic Data Dictionary specifies the Pictogram Category code of each Service Category.

8.2 Service category code no. 11111-11999: Traffic sign pictograms (warning)

Pictograms falling under this category shall be used to give the road users advance warning for an adverse road condition, any hazards to safe driving, or any other conditions to which they should take notice.

Table 2 — List of warning sign codes

Category code		Category code name	Definition
Service category	Picto-gram category		
11	111	Intersection where the priority is prescribed by the general priority rule (Crossroads)	Warning of the existence of a cross-shaped intersection ahead.
	112	Intersection where the priority is prescribed by the general priority rule (Side road right)	Warning of the existence of a side road ahead.
	113	Intersection where the priority is prescribed by the general priority rule (Side road left)	Warning of a side road ahead (Reverse type of code no. 112).
	114	Forked (off to upper right) intersection where the priority is prescribed by the general priority rule	Warning of the existence of a side road. Fork (off to upper right) type of code no. 112.
	115	Forked (off to upper left) intersection where the priority is prescribed by the general priority rule	Warning of the existence of a side road. Fork (off to upper left) type of code no. 113.
	116	Intersection where the priority is prescribed by the general priority rule (T junction)	Warning of a T-shaped level junction at the end of the road.
	117	Intersection where the priority is prescribed by the general priority rule (Y intersection)	Warning of a Y-shaped level intersection ahead.
	118	Intersection where the priority is prescribed by the general priority rule (Staggered intersection)	Warning of a staggered level intersection ahead.
	119~131	Reserved for future use.	
	132	Intersection with a road the users of which must give way	Warning of a priority road at intersection.
	133	Intersection with a road the users of which must give way T-shaped crossing left	Warning of a priority road at T-shaped crossing.

Table 2 *(continued)*

Category code		Category code name	Definition
Service category	Picto-gram category		
	134	Intersection with a road the users of which must give way T-shaped crossing right	Warning of a priority road at reversed T-shaped crossing.
	135	Intersection with a road the users of which must give way T-shaped crossing of fork type Lower left	Warning of a priority road at T-shaped crossing of fork type (lower left) ahead.
	136	Intersection with a road the users of which must give way T-shaped crossing of fork type Lower right	Warning of a priority road at reversed T-shaped crossing of fork type (lower right) ahead.
	137~147	Reserved for future use.	
	148	Warning of roundabout (Clockwise)	Warning of a clockwise roundabout ahead.
	149	Warning of roundabout (Anti-clockwise)	Warning of an anti-clockwise roundabout ahead.
	150~160	Reserved for future use.	
	161	Dangerous bend (right bend)	Warning of a dangerous single curve to the right ahead.
	162	Dangerous bend (left bend)	Warning of a dangerous single curve to the left ahead.
	163~173	Reserved for future use.	
	174	Right turn	Warning of a single sharp curve (turn) to the right. A turn is differentiated from a curve by combining all elements of speed, radius of curve, road rate of incline, intersection angle and visible distance.
	175	Left turn	Notice of a single sharp curve (turn) to the left. A turn is differentiated from a curve by combining all elements of speed, radius of curve, road rate of incline, intersection angle and visible distance.
	176~186	Reserved for future use.	
	187	Reverse curve (right and left)	Warning of a combination of two curves (right and left) ahead (S-bend).
	188	Reverse curve (left and right)	Warning of a combination of two curves (left and right) ahead (S-bend).
	189~210	Reserved for future use.	
	211	Dangerous bend (Double bend, right)	Warning of dangerous double or multiple bends which start with a right curve.
	212	Dangerous bend (Double bend, left)	Warning of dangerous double or multiple bends which start with a left curve.
	213~223	Reserved for future use.	
	224	Winding road (first to the right)	Warning of a winding section, which start with a right curve.
	225	Winding road (first to the left)	Warning of a winding section, which start with a left curve.

Table 2 *(continued)*

Category code		Category code name	Definition
Service category	Pictogram category		
	226~235	Reserved for future use.	
	236	Level crossing with gate or barrier	Warning of the existence of a level railway crossing with gates or barrier ahead.
	237	Other level-crossing	Warning of a level railroad crossing point without gate or barrier ahead.
	238	Intersection with a tramway line	Warning of a road with a tramway line ahead.
	239	Children (right)	Warning of an area where children may exit from a school or playground frequently pass by and cross the road from the right side.
	241	Pedestrian crossing (right)	Warning of an area where pedestrians frequently pass by and cross the road from the right side.
	242	Elderly or disabled pedestrians likely to cross ahead	Warning of an area where elderly or disabled pedestrians likely pass by and cross the road ahead.
	243	Reserved for future use.	
	244	Children (left)	Warning of a crosswalk where children may exit from a school or playground frequently pass by and cross the road from the left side.
	245	Pedestrians crossing (left)	Warning of a crosswalk where pedestrians frequently pass by and cross the road from the left side.
	246	Pedestrian crossing ahead (left)	Warning of a crosswalk where pedestrians frequently pass by and cross the road from the left side.
	247	Pedestrian crossing ahead (right)	Warning of a crosswalk where pedestrians frequently pass by and cross the road from the right side.
	248~252	Reserved for future use.	
	253	Light signals	Warning of a signal-controlled crossing ahead where signal(s) are invisible or hard to identify from a distant point.
	254	Slippery road	Warning of a slippery road surface that may hinder travelling at normal speeds.
	255	Falling rocks (left)	Warning of the possibility of falling rocks or the presence of fallen rocks on road surface from the left side.
	256	Loose gravel	Warning of an unpaved section with loose gravel on the surface that may hinder travelling at normal speeds.
	257	Dangerous shoulders	Warning of a dangerous road shoulder.
	258	Falling rocks (right)	Warning of the possibility of falling rocks or the presence of fallen rocks on road surface (right).
	259~267	Reserved for future use.	
	268	Uneven road	Warning of a bumpy section ahead that may hinder travelling at normal speeds.
	269	Uneven road (hump bridge)	Warning of a road humps or series of road humps on road surface ahead that may hinder travelling at normal speeds.
	271	Uneven road (dip)	Warning of a section with a large single dip on road surface ahead that may hinder travelling at normal speeds.
	272~282	Reserved for future use.	
	283	Traffic merging from the right	Warning of a merge of an inflow lane from the right into through traffic.