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Ships and marine technology — Standard data for shipboard machinery and equipment

Navires et technologie maritime — Données normalisées pour les machines et équipements à bord des navires

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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 document 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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 6, *Navigation and ship operations*.

This second edition cancels and replaces the first edition (ISO 19848:2018), which has been technically revised.

The main changes are as follows:

— Annex A has been updated to define JSON as an equivalent implementation alternative to XML for DataChannelLists and TimeSeriesData. JSON schemas have been introduced to ensure precise definition and validation.

— The example of the codebook in B.2 has been extended to include navigational information, voyage information, weather information around the ship, oil property information and ship motion information.

— In B.3, a full set of standard data names has been added as references, to improve usability.

— In Annex C, the naming scheme has been changed from from “dnvgl-vis” to “dnv-v2”, as well as various updates to the rules for constructing the LocalID.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

On-board computer applications for safety and energy-efficient operations have become increasingly popular. These applications require access to the data of shipboard machinery and equipment.

To access data of navigational equipment, the IEC 61162 series, which covers data exchange, can be used. However, there are no existing standards covering the access of data from other on-board components and systems (e.g. machinery, safety equipment, and hull).

Exchanging nonstandardized data between and/or among applications requires name-based aggregation and format mapping. However, this involves a large amount of labour, which hinders the use of such data.

To improve such situations, this document defines unified requirements and guidelines for developing machine and human-readable identifiers and data structures for shipboard machinery and equipment, with the objective of facilitating the exchange and processing of sensor data from ships.

This document defines two concepts and their models for data exchange: one is Data Channel, and the other is Time Series Data. This document thus defines two distinct data structures and file formats: A Data Channel List, which contains the necessary meta-data, and a Time Series Data format for measurements. The time-series format is designed to be lightweight and therefore contains minimal meta-data information, only in the form of a reference to the channel list.

Data Channel is a concept that represents virtual data transmission channels, and defines time-invariant properties. Data Channel can be viewed as a static description for the different sensor data streams. Data Channel is composed of Data Channel ID and Data Channel Property. Data Channel ID uniquely identifies the logical data channels. Data Channel Property defines attributes of Data Channel.

The purpose of this document is to provide guidance and requirements on exchanging data on board a ship. However, in the future, it is possible that shipboard machinery and equipment will be connected directly to the Internet.

Therefore, considering the compatibility between Data Channel ID and URLs, which are used to identify data on the Internet, Data Channel ID has a hierarchical structure with slashes as delimiters. To represent a hierarchy, Data Channel is categorized in accordance with the standardized naming scheme, called Naming Rule, and named by concatenating these category names with slashes.

Annexes B and C provide two types of naming scheme, an example of a codebook and lists of standardized category names given according to these schemes.

These naming schemes provided in Annexes B and C are not designed to unify Data Channel ID, but it is assumed that some entities will develop, maintain and manage codebooks and that these codebooks will be disclosed widely.

Data Channel Property is assumed to be used to automate data processing and help understanding of data. Data Channel Property should be used because it is considered to be essential to both computer applications and humans for the reasons mentioned above.

Time Series Data is a concept that represents collection of time-stamped data. Time Series Data is assumed to be used for sharing latest data and for analysing trends made over time-stamped data.

For reliable data exchange, this document recommends the use of Extensible Markup Language (XML) and XML Schema for data encoding and data structure definition. Using XML and XML schemas makes it possible to define data structures precisely and validate data according to such definitions. As a result, data can be exchanged more reliably between and/or among computer applications.

Furthermore, for convenience and efficiency, this document also defines data structures in JavaScript Object Notation (JSON) and Comma Separated Values (CSV) format.

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Ships and marine technology — Standard data for shipboard machinery and equipment

1 Scope

This document provides requirements and guidance on the capture and processing of data from sensors monitoring:

— the structure of the ship;

— shipboard machinery and equipment on board the ship;

— ship operational information.

It is intended for implementers of software used to capture and process such data.

This document describes how to name the sensor and required data item, as well as how to describe the data for shipboard machinery and equipment.

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 8601-1, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO 80000 (all parts), *Quantities and units*

IEC 80000 (all parts), *Quantities and units*

IEC 62923-1:2018, *Maritime navigation and radiocommunication equipment and systems — Bridge alert management — Part 1: Operational and performance requirements, methods of testing and required test results*

W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes, W3C Recommendation

RFC 4180, *Common Format and MIME Type for Comma-Separated Values (CSV) Files*

3 Terms and definitions

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

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

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

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

3.1
alert data
information that represents abnormal conditions of shipboard machinery and equipment

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