International Standard

ISO 22166-201

Robotics — Modularity for service robots —

Part 201:
Common information model for modules

Robotique — Modularité des robots de service —

Partie 201: Modèle d'information commun pour les modules

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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 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 299, *Robotics*.

A list of all parts in the ISO 22166 series can be found on the ISO website.

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.

Introduction

This document provides a common information model (CIM) for modules which compose service robots based on ISO 22166-1. Based on the CIM, modules can easily be connected and data exchanged between them. It has been designed to enhance the interoperability, reusability, and composability of modules. CIM is a meta-model and is a base model for all kinds of modules such as hardware modules, modules with hardware and software aspects, software modules, and their composite modules. Hence CIM provides meta characteristics that modules should possess.

Module makers, module integrators, robot makers, robot developers, and robot system integrators are able to use CIM in order to obtain the necessary modules more easily, utilize various modules according to function and budget, and develop a new (composite) module based on CIM. The CIM is able to make design of modules, operation and maintenance of service robots help.

The CIM provides four information types:

— information for module identification;

— information for module selection;

— information for module integration;

— information for module operation and maintenance.

The CIM, as a meta model, consists of number of submodels, which are Module ID, Properties, Input and Output Variables, Status, Services, Infrastructure, Safety and Security Level, Modelling, Executable Form.

The implementation model of CIM will be provided in upcoming standards, with an example being ISO 22166-202 for software modules.

The ISO 22166 series applies to composite modules and various types of service robots.

This document presents requirements and guidelines on the information model of a service robot's modules for ensuring nine principles of modularity presented in ISO 22166-1.

Robotics — Modularity for service robots —

Part 201:
Common information model for modules

1 Scope

This document specifies requirements and guidelines for the common information model (CIM) for modules of service robots to achieve interoperability, reusability, and composability.

This document specifies the structure of the CIM and details the intended use and meaning of its attributes and subclasses.

This document applies to service robots.

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 22166-1:2021, *Robotics — Modularity for service robots — Part 1: General requirements*

IETF RFC 4122, *A Universally Unique IDentifier (UUID) URN Namespace*

IEEE/Open Group 1003.1-2017, *IEEE Standard for Information Technology--Portable Operating System Interface (POSIX(TM)) Base Specifications, Issue 7*

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
information model
IM
abstraction and representation of the entities in a managed environment, their properties, operations, and the way that they relate to each other

[SOURCE: ISO 22166-1:2021, 3.1.11 — modified]

3.2
common information model
CIM
information model that modules most frequently use in service robots