

Standardisation Efforts on Robotics

Newsletter – July 2010

Introduction

Industrial robots have been part of industrial automation for a long time and are thus covered by several international standards such as ISO 10218. As tasks for industrial robots have gotten more complex, e.g. cooperation with a worker, new standards are currently being developed. New standardisation efforts have also been started on service robots in order to specify general safety requirements before serial products enter the market.

Within the EU-funded project euRobotics (<http://www.eurobotics-project.eu>), standardisation efforts on robot safety are promoted and effectively communicated among stakeholders. EUROPE members will be informed about current developments in ISO standardisation committee TC184/SC2 “Robots and robotic devices” on a regular basis.

Organisation of Standardisation Committees

The development of ISO standards dealing with industrial robots and service robots takes place in ISO committee TC184/SC2 “Robots and robotic devices”. At the moment it consists of four working groups which usually meet thrice a year. Detailed information about the structure can be found on the [ISO website](#).

Nations that are currently actively participating in developing these standards are France, Germany, Japan, Korea, United Kingdom and the United States. WG3 gets additional contributions from Canada, Italy, Sweden and Switzerland.



Participants of WG7 in Paris, 21–23 June 2010

Progress in WG1 - Vocabulary

Secretary: Mattias Lafvas (Sweden)

Chair: Soon-Geul Lee (Korea)

Standard: ISO 8373 – Robots and robotic devices – Vocabulary (Committee Draft)

The purpose of this working group is to compile terms and definitions from all standards dealing with robots. At the moment these are ISO 10218-1/2 and ISO/CD 13482. During the meetings in Orlando in 2010-02 and in Paris in 2010-06 the working group has made great efforts to adjust the existing robot-related terms and definitions in a way that they fit new robot types such as service robots for medical and non-medical tasks. Where necessary the clauses are now formulated in a more general manner. Some new definitions relating for example to mobile platforms have been added. In the next months the revised draft version of ISO 8373 will be officially distributed for international commenting and will then become a DIS (draft international standard).

Progress in WG3 – Industrial safety

Secretary: Mattias Lafvas (Sweden)

Chair: Jeff Fryman (USA)

Standards:

- ISO 10218-1 – Robots for industrial environments - Safety requirements - Part 1: Robot (will be published in the first half year of 2011)
- ISO 10218-2 – Robots for industrial environments - Safety requirements - Part 1: Industrial robot system and integrator (will be published in the first half year of 2011)
- ISO/TS 15066 - Technical specification on collaborative workspace (under elaboration)

The new international industrial robot safety standard ISO 10218 consists of two parts: Part 1 specifies requirements and provides guidance for the assurance of safety in design and construction of the robot. This part has been adjusted to the New Machinery Directive. It will soon pass the FDIS-balloting and will probably be published in the first half year of 2011.

Part 2 of the new standard ISO 10218 will provide guidance for the safeguarding of personnel during robot integration, installation, functional testing, programming, operation, maintenance and repair. After a forthcoming second FDIS balloting Part 2 is also expected to be published in the first half-year of 2011 together with Part 1.

In addition to ISO 10218-1 and ISO 10218-2 a new project within WG 3 has been registered under ISO/TC 184/SC2. A technical specification on collaborative workspace – ISO/TS 15066 – will be elaborated.

Progress in WG7 – Personal care safety

Secretary: Mattias Lafvas (Sweden)

Chair: Gurvinder Virk (UK)

Standards:

- ISO 13482 – Robots and robotic devices - Safety requirements - Non-medical personal care robot (committee draft)
- ISO 80601-2-x – Medical robot (new work item)

As agreed in the last meeting in Orlando in 2010/02, the safety standard on non medical care robots has been restructured to improve the readability of the document. The chapter dealing with the various hazards is now divided in clauses for each hazard. These clauses now list instructions for inherently safe design, possible safety measures and requirements for the documentation. In addition, methods to validate the level of risk reduction are listed here. First steps have been undertaken to fill existing

2/4

<http://www.eurobotics-project.eu>

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gaps in order to provide this information for all hazards. During the meeting, several national delegations presented first results of detailed risk analyses for the three robot types “mobile servant robot”, “people carrier robot” and “physical assistant robot” that are in the main focus of the document. The final results of these analyses will be presented during the next meeting in Budapest in 2010/10. Naturally the restructuring of the document resulted in a large number of comments from the national member bodies. Unfortunately these comments could not all be resolved during the meeting and so it has been agreed to have a couple of e-meetings in the next months as well as another personal meeting in Nagoya, Japan in 2010/08. This tight schedule is necessary because the document has to be prepared for voting in order to enter the next phase which is a Draft International Standard (DIS). The experts working on the standard for medical robots have now met for the third time. For the medical robot standard the group decided that it should cover particular requirements for safety and essential performance. It will be led by ISO and named by 80601-2-x. The standard will be general in the first version and shall get more specific in the next versions. The group will focus on a few types of medical robots. These will be surgical robots, implantable robots, “nursing” robots, rehabilitation robots, positioning robots and robotic limbs. Special consideration has to be given to the relation between robot and patient and to the relation between robot and operator or third party. For the patient the intended task is important, for the operator and third party only the safety of the system matters. The group came to the conclusion that the main hazards are caused by the mechanical movement made by the robot and that they have to focus on this. Most of the other hazards for the robot are mainly described in IEC 60601-1. Although hazards caused by data failure which do not lead to unintended movement are covered in other standards.

Progress in WG8 – Service robots

Secretary: Mattias Lafvas (Sweden)

Chair: Seungbin Moon (Korea)

Task: Determine need for additional standards for service robots

As agreed in previous meetings, study groups were established which work on the three topics which have been identified to be of future interest: “coordinate systems”, “performance” and “robot contents”. These study groups presented first material during the meeting in Paris in 2010/06. One or more of these groups will probably be converted to an official working group after the next SC2 plenary meeting in October 2010. This also depends on the number of experts available for these groups. During the meeting a report on standardization activities by other countries and organizations were given. Some of these standardisation groups are in liaison with the corresponding groups at ISO.

Topics that are currently under development are:

- IEC: vacuum cleaners and lawn movers
- OMG: service robot software
- ASTM: search and rescue robots
- Japan: Vocabulary
- Korea: Service robot safety and other safety related topics

The next meetings

For service robots (WG1, WG7, WG8) the next meetings will take place in Budapest, Hungary (October 22-29) and in Wellington, New Zealand (February 2011). As some of the working groups will wait for the results of the official votes, some WG meetings will be shorter than usual or will deal with additional material that might be included in future versions of the standards.

The standardisation group on industrial robot safety (WG3) will continue their work in Budapest (October 25-27, 2010). For February 2011 a meeting is scheduled to take place in Orlando.

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