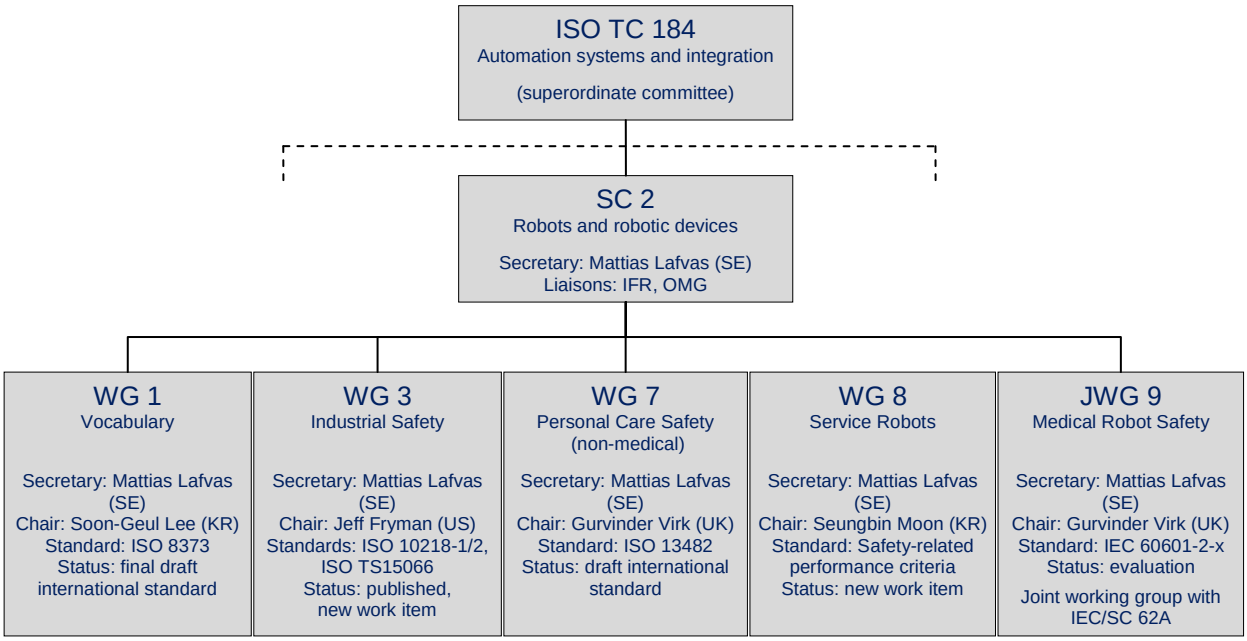
Newsletter: Standardisation Efforts on Industrial and Service Robots

Industrial robots have been part of industrial automation for a long time and are thus covered by several international standards such as the current ISO 10218[1]. As tasks for industrial robots have gotten more complex, e.g. collaboration with workers, new standards are currently being developed. New standardisation efforts have also been started on service robots for medical and household applications in order to specify general safety requirements before serial products enter the market.

Within the EU-funded project euRobotics, standardisation efforts on robot safety are promoted and effectively communicated among stakeholders. EURON and EUROP members will be informed about current developments in ISO standardisation committee TC 184/SC 2 “Robots and robotic devices” on a regular base. Also, working groups of the relevant ISO Technical Committee TC 184 “Automation systems and integration” are open for contributors and experts are encouraged to participate.[2]

Organisation of Standardisation Committees

All standard development related to robots takes place in ISO TC 184/SC 2 committee and is organized in five working groups (see figure below). In 2011, the joint working group JWG 9 was established in order to intensify the work on a safety standard for medical robots.



Standards are developed through the instrument of “commenting”: During balloting periods, which are held regularly, each national standardization organization has the possibility to write comments

[1] http://www.iso.org/iso/search.htm?qt=10218&searchSubmit=Search&sort=rel&type=simple&published=on

[2] For more information regarding possible participation in TC184/SC2, please contact: theo.jacobs@ipa.fraunhofer.de

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proposing to change, delete or add text to the standard. In the international meetings these comments are resolved in discussion and agreed changes are applied to the document.

Nations that are currently actively participating in developing these standards are: China, France, Germany, Italy, Japan, Korea, United Kingdom and the United States. WG 3 gets additional contributions from Canada, Sweden and Switzerland. The working groups usually meet three times a year in different locations in the US, Europe and Asia. Meetings of the SC 2 committee are held every two years.

Further information is available at the ISO Website[3].

WG 7 – Last chance to contribute to the future safety standard for personal care robots!

Secretary: Mattias Lafvas (Sweden)
Chair: Gurvinder Virk (UK)
Standard: ISO 13482 – Robots and robotic devices – Safety requirements for service robots – Personal care robot (Draft International Standard)

During the last two international meetings in Tokyo (April 2012) and Milan (July 2012), the working group has resolved all comments that were received during the first DIS balloting period. In this process, the standard underwent many changes. Chapters were restructured and new content was added to prepare the draft for publication. Due to the high number of changes, it was decided to have another DIS balloting period from 26th July to 26th September 2012. This balloting is the last possibility to contribute to the future safety standard on personal care robots. After the balloting has ended, no more technical changes will be made in the draft document before it will be published in the middle of 2013.

Progress in other working groups

Progress in WG 1 – Vocabulary and coordinate systems

Secretary: Mattias Lafvas (Sweden)
Chair: Soon-Geul Lee (Korea)
Standards: ISO 8373 – Robots and robotic devices – Vocabulary (published)
ISO 9787 – Robots and robotic devices – Coordinate systems and motion nomenclatures

The standard ISO 8373 on terms and definitions for industrial and service robots has now been published. The standard contains basic definitions such as “robot” or “autonomy” and also gives an overview about commonly used terms in the fields of mechanical structure, geometry and kinematics, programming and control, performance and sensing, and navigation. Currently, the need for further standards on terms and definitions for service robots are being discussed.

In addition to the standard on vocabulary, WG 1 has nearly finished the revision of ISO 9787 dealing with the definition of coordinate systems for robots. As the former standard was limited on industrial robots, new coordinate systems for service robots and especially for mobile platforms were developed.

[3] http://www.iso.org/iso/standards_development/technical_committees/other_bodies/iso_technical_committee.htm?commid=54138

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The revised standard has recently passed the DIS balloting which means that no more technical changes will be made until the publication in 2013.

Progress in WG 3 – Industrial safety

Secretary: Mattias Lafvas (Sweden)
Chair: Jeff Fryman (USA)
Standards: ISO 10218-1 – Robots for industrial environments – Safety requirements – Part 1: Robot (published in 2011
ISO 10218-2 – Robots for industrial environments – Safety requirements – Part 1: Industrial robot system and integration (published in 2011)
ISO/TS 15066 – Technical specification on collaborative workspace (under elaboration)

In 2011, WG 3 finished the revision of the safety standards for industrial robots ISO 10218-1 and ISO 10218-2. During the last year, a technical specification ISO/TS 15066 has become a new item which deals with requirements for collaborative robots and specifying force and pressure limits for a safe contact between human and robot.

The latest meeting of WG 3 took place in Mainz, Germany in June 2012. In depth, discussions were going on around the formulation of requirements for robot systems limited by “force and power”. A methodology for test procedures was thereby developed in combination with a table of limiting force values. Strong effort is taken by the international group to come up with valid as well as manageable recommendations.

The next meeting of WG 3 will take place in Montreal, Canada, around the 8th of October, in conjunction with the 7th International Conference on the Safety of Industrial Automated Systems (SIAS).

Progress in WG 8 – Service robots

Secretary: Mattias Lafvas (Sweden)
Chair: Seungbin Moon (Korea)
Task: Determine need for additional standards for service robots
Standard: Performance criteria for mobile service robots

For several years, WG 8 had the task to monitor standardization activities in other organizations such as OMG and IEC which included official liaisons to other working groups. In addition, the demand for new ISO standards in the area of service robotics had been explored. In 2011, WG 8 has laid the foundations for a new work item on performance criteria, which will be developed in the next years.

A first structure for standards on performance criteria for mobile service robots was developed during the meeting in Milan in July 2012. It is envisaged that a standard with several parts will be developed, starting with a general standard on performance criteria. Future standards might focus on certain robot types such as mobile servant robots, person carrier robots, legged robots and other.

Progress in JWG 9 – Medical robot safety

Secretary: Mattias Lafvas (Sweden)
Chair: Gurvinder Virk (UK)
Standard: IEC 60601-2-x (Evaluation of new work item)

A new working group was formed in cooperation with IEC committee SC 62A. This joint working group (JWG 9) has the task to evaluate requirements for a new standard on the safety of medical robots which will be added as a part of IEC 60601-2. To prepare the standardization process, initial concepts,

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e.g. the definition of autonomy, are being developed which will be the foundation for a future safety standard for medical robots.

Possibilities to get involved in standardization work

For the European academia/research and industry it is crucial to participate in all standardization working groups with a sufficient number of technical experts. Only by doing so, innovations and products will be considered during the standardization process and latest research results can be incorporated in the standard.

Encouragement to attend international meetings

Technical experts who attend international meetings, vote in international balloting procedures and write comments to propose changes in the documents are appointed by the national standardization organization of their respective country. In order to get nominated, interested persons from industry or research institutes should contact their national standardization body to ask for details. Apart from formal contribution as a technical expert, it is also possible to visit a meeting as an observer. Observers are also formally appointed by national standardization organizations, but do not have the right to participate in official balloting.

The next international meetings are planned as follows:

- October 8-10, 2012: Meeting of WG 3 in Montreal, Canada
- October 15-24, 2012: Subsequent meetings of WG 1, 7, 8 and JWG 9 in Seoul, Korea
- February 2013 (to be confirmed): Subsequent meetings of WG 1, 7, 8 and JWG 9 in San Francisco, USA
- June 2013 (to be confirmed): Subsequent meetings of WG 1, 7, 8 and JWG 9 in Bristol, UK

Benefit from travel cost subvention

The EU-funded coordination action euRobotics has the possibility to reimburse travel costs (within certain limits) to an international meeting for interested first-time visitors from a European country. If you are interested to join an international meeting, please contact Theo Jacobs (theo.jacobs @ipa.fraunhofer.de). It is obvious that only a long term engagement in these standardization efforts is beneficial for the WG or the participants.

Contributing to national mirror committees

When several experts from one country participate in standardisation, a national mirror committee can be formed. In these national committees homework and comments for the international meetings are coordinated andresults from the international meetings are disseminated to the national community. Even if no mirror committee has been formed yet, it is possible for interested technical experts to contribute to standardization on a national level without attending the international meetings, for example by making comments for an international balloting.

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Visit the IROS workshop „Safety in Human-Robot Coexistence & Interaction“

The IROS workshop “Safety in Human-Robot Coexistence & Interaction: How can Standardization and Research benefit from each other?” intends to bring together researchers, standardization experts, and industrialists, who are all together responsible for ensuring that robots can finally come from the research labs into all aspects of everyday life. The event shall initiate close interaction and collaboration between these communities in order to bring closer the different viewpoints, define remaining challenges in the field of safety in robotics together, and converge to a common roadmap that all can commit to in order to reach a coordinated action at some point.

The workshop takes place on Friday, 12th October at IROS.

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