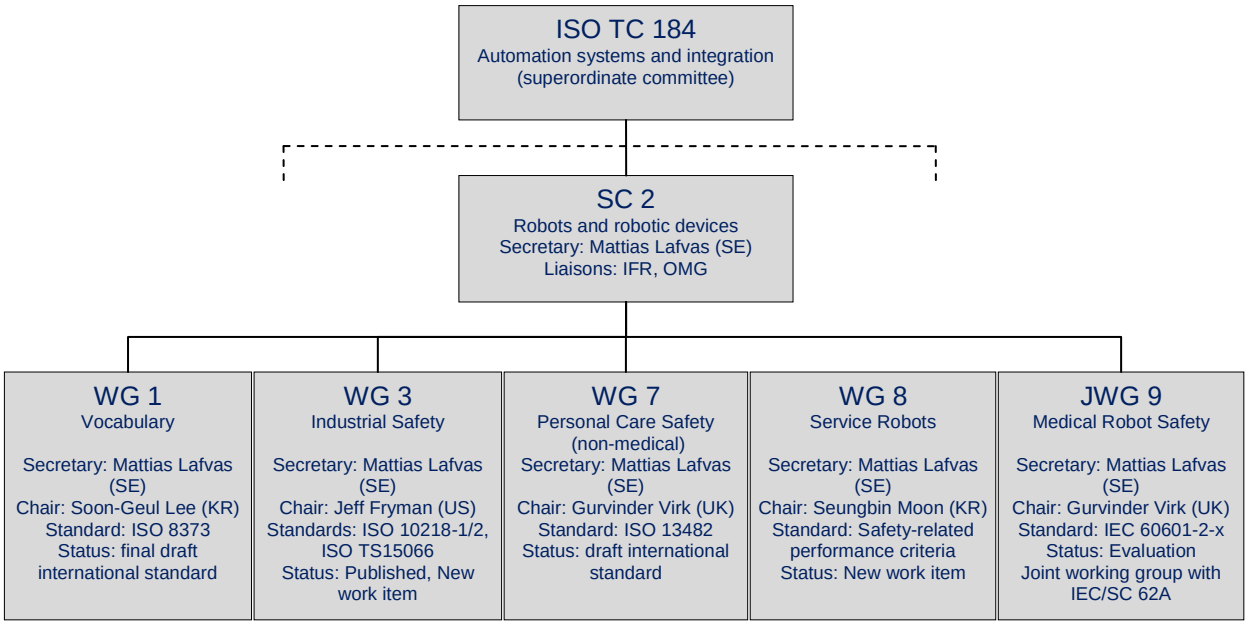
Newsletter: Standardisation Efforts on Industrial and Service Robots

Industrial robots have been part of industrial automation for long 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. cooperation with a worker, 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. EUROP members will be informed about current developments in ISO standardisation committee TC184/SC2 “Robots and robotic devices” on a regular bases. Also, working groups of the relevant ISO Technical Committee TC184 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 TC184/SC2 committee and is organized in five working groups (see figure below). In 2011, the joint working group JWG9 was established in order to intensify 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 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.

[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

http://www.eurobotics-project.eu
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Nations that are currently actively participating in developing these standards are China, France, Germany, Italy, Japan, Korea, United Kingdom and the United States. WG3 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 ISO Website[3].

Progress in WG1 – Vocabulary and coordinate systems

Secretary: Mattias Lafvas (Sweden)
Chair: Soon-Geul Lee (Korea)
Standard: ISO 8373 – Robots and robotic devices – Vocabulary (Final Draft International Standard)
Task of this working group is the revision of ISO 8373 from 1996 which provides terms and definitions for industrial robots. The task of refreshing the standard and adding terms related to service robotics is now nearly finished. In 2011 the DIS balloting took place with the result that some core definitions such as "robot" were slightly changed to prevent non-robotic applications such as industrial lifting devices to be included into the scope of the definition. To comply with the standards 10218-1 and 2, additional definitions were inserted in the document. The standard has recently entered FDIS status with the balloting (limited to the proposition of editorial changes) being finished in February 2012. The standard will be formally published in the second half of 2012.
In addition to the standard on vocabulary, WG1 has recently started 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 are now being developed. In 2011 the working group on coordinate systems started their work and was already able to present an initial draft of a future standard which is based on a Japanese proposal. As the definition of conventions for the placement and orientation of coordinate systems need less discussion than the definition of e.g. safety requirements, it was proposed to skip several steps in the standardization process so that the standard can enter the final balloting in the next months.

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 (published in 2011
- ISO 10218-2 – Robots for industrial environments - Safety requirements - Part 1: Industrial robot system and integraton (published in 2011)
- ISO/TS 15066 - Technical specification on collaborative workspace (under elaboration)

In 2011 WG 3 working on standards for industrial robot safety finished the adaption of ISO 10218-1 "Safety requirements for industrial robots - Part 1: Robots" to the new European Machinery Directive. In addition a second part developed since 2006 was published as ISO 10218-2 "Safety requirements for industrial robots - Part 2: Robot systems and integration". While the first part of the standard deals with safety requirements for the design of industrial robots, the second part gives advice on integration of robots and peripheral components to an industrial robot system.
During the last year an initial draft of a new technical specification dealing with requirements for collaborative robots and specifying force and pressure limits for a safe contact between human and robot was created. Figures like pain tolerances and maximum force and pressure values are provided by research projects.

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

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Progress in WG7 – Personal care safety

Secretary: Mattias Lafvas (Sweden)
Chair: Gurvinder Virk (UK)

Standards:

ISO 13482 – Robots and robotic devices - Safety requirements for service robots - Personal care robot (Draft International Standard)

During the last year the new safety standard for personal care robots ISO 13482 was further detailed by adding requirements for the safe design of control system functions. An Annex now provides exemplar risk assessment for different robot types. In addition, minimal required performance levels according to ISO 13849-1 are specified in the main text. By regular visits of a CEN consultant it is ensured that the standard can later be harmonized under the European Machinery Directive.
ISO 13482 has passed DIS balloting in February 2012. This balloting usually is the last chance for all participating countries to propose technical changes to the document. During the balloting period a high number of comments have been received which will change the original balloting document to a large extent. As consequence a second, extraordinary DIS balloting will take place in the second half of 2012 to allow all countries to vote on a document which is closer to the final release. This will be the final opportunity for all interested countries to contribute to the technical development before the standard is released in 2013.

Progress in WG8 – Service robots

Secretary: Mattias Lafvas (Sweden)
Chair: Seungbin Moon (Korea)
Task: Determine need for additional standards for 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 WG8 has laid the foundations for a new work item on performance criteria, which will be developed in the next years. With respect to the limited number of European experts being able to contribute to a new, relatively wide standard on performance criteria, it was decided to narrow the scope on safety-related performance criteria. In a first meeting in Orlando in February 2012 methods for the standardized validation of safety functions such as obstacle detection, obstacle avoidance and the measurement of breaking distances were proposed which will be discussed and further detailed in future meetings.

Progress in JWG9 – Medical robot safety

Secretary: Mattias Lafvas (Sweden)
Chair: Gurvinder Virk (UK)

Standards:
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 (JWG9) 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, 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.

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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:

- April 23-27, 2012: Meeting in Tokyo, WG7 only
- July 2-13, 2012: Subsequent meetings of WG1,7,8 and JWG9 in Milan
- October 22-23, 2012 (to be confirmed): Subsequent meetings of WG1,7,8 and JWG9 in Seoul
- February 2013 (to be confirmed): Subsequent meetings of WG1,7,8 and JWG9 in Brazil

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 form 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.

Contribute 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 and coordinated and results 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.

Invitation to Safety-Workshop at European Robotics Forum

Safety issues for industrial and service robots will be addressed at European Robotics Forum, March 5-7 2012 in Odense. In the workshop “Safe Human Robot Interaction with Industrial and Service Robots” (March 6, 11am, Track 3) selected speakers will give an overview about current activities in ISO standardization and present latest research results from projects aiming at increasing robot safety and developing a metric for measuring safe contact between human and robot.
Further information is available at euRobotics Website[4].

[4] http://www.europeanrobotics12.eu/program.aspx

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Compiled and written by Theo Jacobs:
Dipl.-Ing. Theo Jacobs
Department Robot Systems
Fraunhofer Institute for Manufacturing Engineering and Automation (IPA)
Nobelstraße 12
D-70569 Stuttgart, Germany
Tel. +49 711 / 970 -1339
Fax +49 711 / 970 -1008
theo.jacobs@ipa.fraunhofer.de
www.ipa.fraunhofer.de

"Theo Jacobs is a research scientist at Fraunhofer IPA. His focus is on mechanical engineering in the field of robotics. The major project he is involved in is the development of the "Care-O-bot 3" and its successor where he is responsible for the hardware design. Theo Jacobs is also a Member of ISO TC184/SC2 dealing with the development of safety standards for industrial and service robots."

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