

Massey University **ISO robot standardization activities** ISO

**Industrial** → **Service**

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 (Personal care robot safety)

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Massey University **Overview of presentation** ISO

- **Update on ISO robot standardization activities**
- **Drivers for the future**
  - Industrial robots → service robots
- **ISO SC2 work groups**
  - **WG1: Vocabulary**
  - **WG3: Industrial robot safety**
  - **WG7: Personal care robot safety**
  - **WG8: Service robots**
- **Conclusions**

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- Prior to 2004 most robot standardization activities focussed on industrial environments. ISO and IEC are main international organisations with responsibilities for the standardization
- EC funded Network of Excellence CLAWAR (1998-2005) ⇒ primary aim to widen the application base for robotics. Initiatives in robot modularity and standardisation for mobile service robots
- Formal contacts made to several national standards bodies to activate the work required
  - BSI (Univ Leeds, UK), AFNOR (Cybernetix, France), SIS (Orebro, Sweden), ONH (Univ Vienna, Austria), IBN, (RMA, Belgium), BIS (BAS, Bulgaria), FSA (HUT, Finland), DIN (F-IEF, Germany), MSZT (Univ Budapest, Hungary), ENIU (UNICT, Italy), NNI (TNO, The Netherlands), PKN (Poznan, Poland), IPQ (ISQ, Portugal), AENOR (CSIC, Spain)
- New robot standardization work under with SC2: Robots and robotic systems proposed. ISO Resolution to setup an ISO Advisory Group on “Standards for mobile service robots”, with GS Virk as Chairman.
  - Advisory Group setup in June 2005 with GS Virk as Chair with ≈30 nominated experts + Observers for maximising input
  - Advisory Group reported results at TC184/ SC2 Plenary meeting in Paris on 15-16 June 2006
  - Creation of a work group on Personal care robot safety (Prof Gurvinder S Virk, UK as chair)
  - Creation of an Work group on Service robots (Prof Seungbin Moon, Korea as chair)
  - Creation of a work group on robot vocabulary (Rodolphe Gelin, France as chair; now Prof Moon)



Manufacturing in “Industrial environments”

Massey University **New service robots** ISO

**Passenger Robots**

- i-foot (TOYOTA)
- WL-16RII (Waseda Univ.)
- i-Swing (TOYOTA)

**Surgery Robots**

- Da Vinci (Intuitive Surgical)

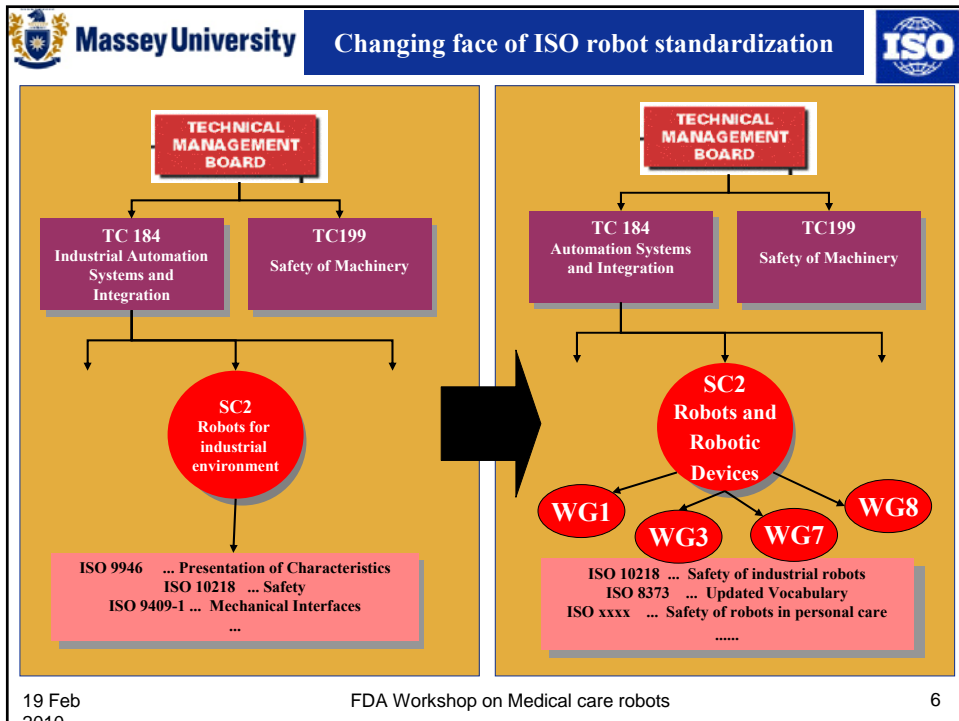
**Care Robots**

- Regina-JII (Japan Logic Machine)
- GUIDO (Haptica)
- CARE-O-BOT (Fraunhofer-IPA)

**Domestic Robots**

- Roomba (iRobot)
- Automower (Electrolux)

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- **Robot:** First used by Czech writer Karel Capek in a play entitled Rossum’s Universal Robots in 1921. Capek’s robots were hard-working humanoid machines. The word derives from robota, the Czech word for slave labourer
- **Robotics:** The term robotics, meaning the technical field encompassing robot technology, was first used by Isaac Asimov in 1942 in a short story entitled Runaround
- No “official ISO” definition of **robot**
- **Official ISO definition (ISO 8373):** An **industrial robot** is an **automatically controlled, reprogrammable, multipurpose manipulator, programmable in three or more axes which may be either fixed in place or mobile for use in industrial automation applications**
- **Current trends:** term “**robot**” is now being used for systems that have “**motion**” and “**intelligence**” rather than being “**multi-purpose**” as defined in ISO 8373



	Industrial Robots	Service Robots
<b>Working environments</b>	Controlled and defined environments	Information structured/ unstructured environments
<b>Users</b>	Training for specified tasks in defined environments	Training to cover wide range of tasks in info structured/ unstructured environments
<b>Safety</b>	Machine dependant	Dependent on the robot and the user
<b>Working philosophy</b>	To keep robots and humans separated (see ISO10218-1)	Robots and humans must share workspace for providing/ receiving the services
<b>Machine design</b>	Flexible on commissioning	Flexible on demand



- **Manufacturing robots in industrial environments: The current situation sees robots as very dangerous and**
  - Can only be used to do well-defined tasks in well-defined environments
  - Can only be used by specialist and trained operators and users
  - Have ISO rules and regulations that try to largely “separate the robots from the humans” due to the potential hazards
- **Services Robotics: The future? Robots need to be**
  - Used for a wide range of requirements + environments not easily defined
  - Used by non-specialist users
  - In the same space as the humans; need for regulations especially safety
- **How to make the transition?**
  - Don’t develop robots but develop reusable robot technologies (Japan)
  - No standards – Safety a big concern
  - Widen acceptability?
  - Ethics becoming important?



- **WG1 Vocabulary on robots and robotic devices**
- **WG3 Industrial robot safety**
- **WG7 Personal robot safety**
  - Non-medical personal care robot safety
  - Medical care robot safety
- **WG8: Service robots**
- **Countries involved: France, Germany, Hungary, Japan, Korea, Sweden, Switzerland, UK, USA**
- **Liaisons: IEC, IFR, IEEE, DICOM**



- **robot:** actuated mechanism programmable in more than one axis with a degree of autonomy, moving within its environment, to perform intended tasks
- **service robot:** robot that performs useful tasks for humans, society or equipment excluding industrial automation applications
- **autonomy:** ability to control movement and communication to perform intended tasks without human intervention
- **personal care robot:** service robot with the purpose of aiding actions or performing actions that contribute directly towards improvement of the quality of life of individuals
- **medical robot:** a robot or a robotic device intended to be used as a medical device



- Robotics is moving to a new era: Services Robots aimed at mass markets
- New technologies need to be developed to meet the requirements of this new sector where close human-robot interaction is needed
- Safety standard needed urgently to assist rapid development
  - **non-medical personal care robot** safety standard due to be published in 2011
  - **medical care robot safety standard:** work started in 2009, due to progress approximately 2 years behind non-medical robot work