Istituto di Tecnologie Industriali e Automazione
Consiglio Nazionale delle Ricerche

from research …. to market

Robot e Direttiva Macchine

Federico Vicentini

Seminario INAIL – presentazione 9° rapporto SM 2017
12 Dicembre 2017

robotica

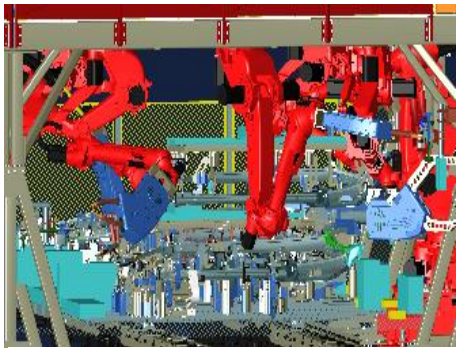
IRAS

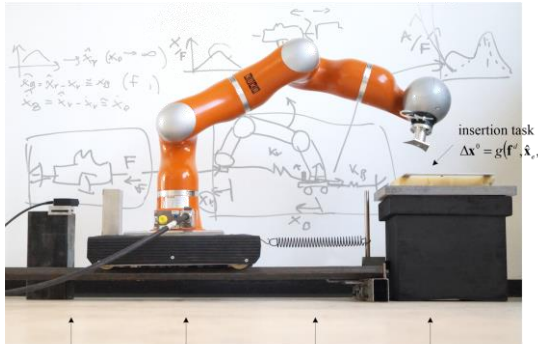
INTELLIGENT AND AUTONOMOUS ROBOT SYSTEMS

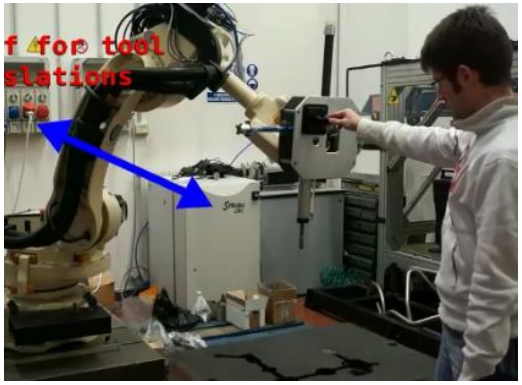
Human-Robot Interaction Control; Environment-Robot Interaction Control; Robot Design, Dynamics and Control; Multi Robot Cooperation.

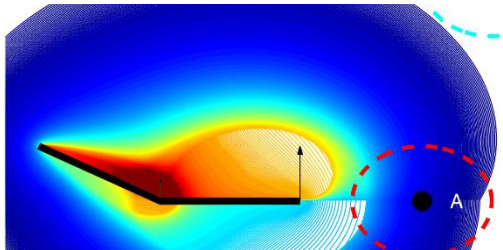
industriale

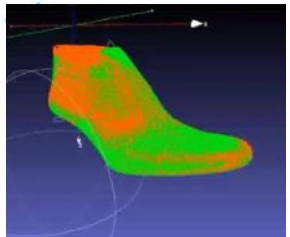
medicale











Matteo Giussani, Niccolò Iannacci

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Federico Vicentini

Researcher at CNR-ITIA

PhD Mechanical Systems Engineering (2007), MS Mechanical Engineering (2003)

Robot safety, human-robot interaction and distributed automation systems

Deputy Coordinator

“Industrial Robotics” Topic Group

Member ISO TC 299 / WG3 Industrial Safety

Member ISO TC 199 / WG12 Human-Machine physical Interaction

Coordinator UNI/CT24/GL09 Robots and Robot Systems

Robots and Machinery Directive

1. buzzwords: collaborative robotics
2. in or out of the MD? physical contact in robotics
3. ongoing standardization in robotics
4. gaps (in standards, on the shopfloor)

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collaborative robots

hype, advantages, potential, reality, housekeeping

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courtesy of ABB

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courtesy of Universal Robots

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courtesy of UR

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The hype. Why collaborative robots are so popular?

- «easy to install and program»
- «improve ergonomics, help operator for heavy tasks»
- «fastest operations, smaller footprint (allow sharing space)
- «are affordable»
- «being safe, they don’t need other devices and safety»

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Reality and housekeeping.

✓ collaborative applications, not robots.
The importance of safety functions, layouts and misues.

✓ common language (market, social, etc) vs. normative definition.
Collaborative, coexisting, cooperative, …

✓ inform, train, listen

✓ the problem of reaching small businesses

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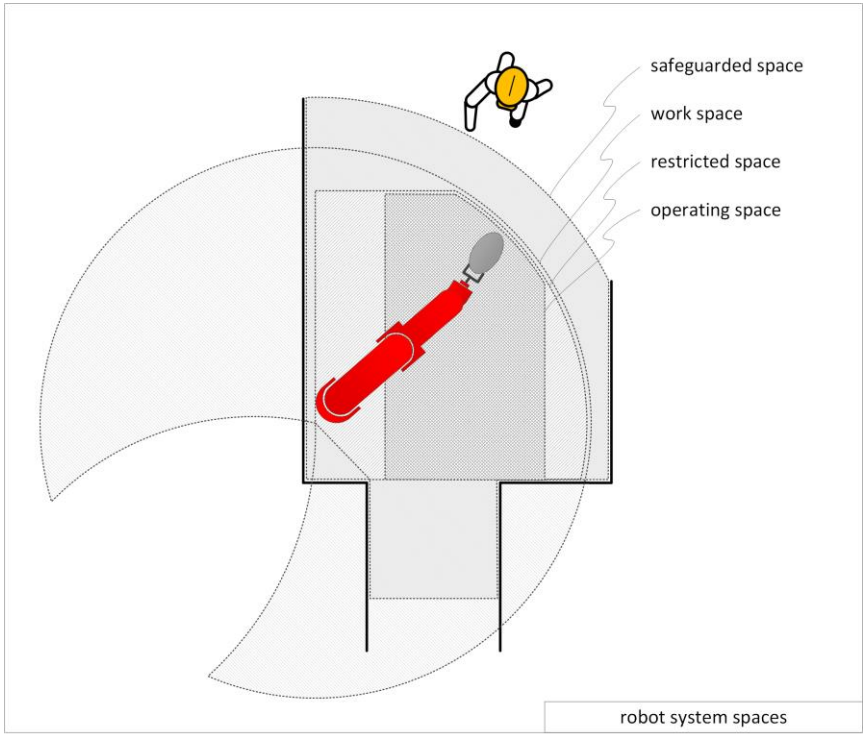
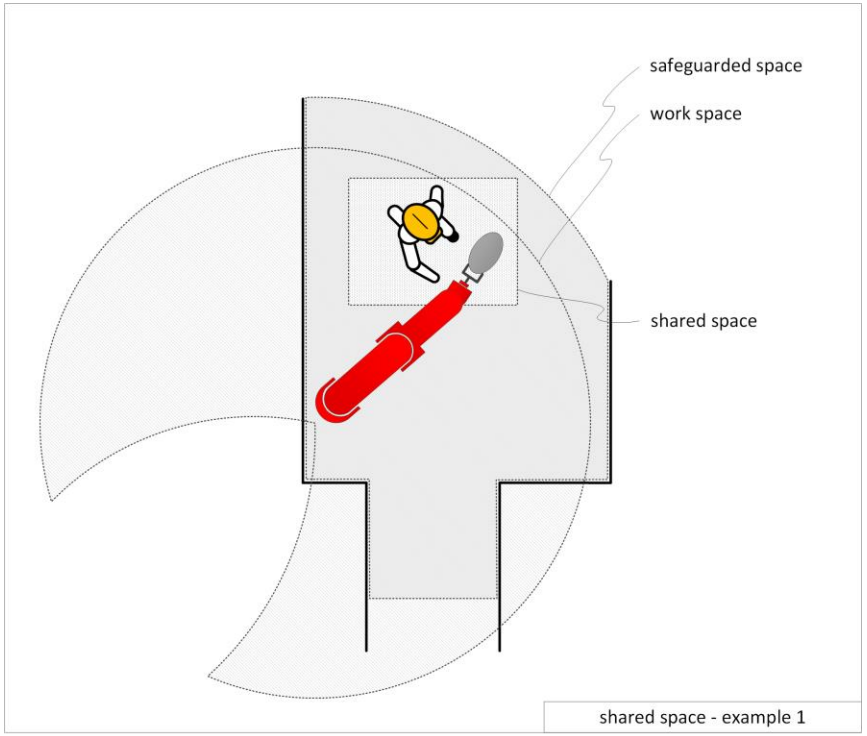
collaborative modes and EHSR

a new perspective





prevent hazard
(robot halted/stopped)

reduce risk
(robot operational)

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SMS (§5.5.1)
Safety-rated
Monitored Stop

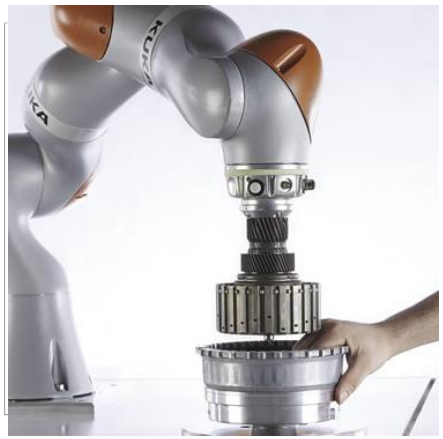
- ✓ presence
- ✓ Safe Holding Torque

HG (§5.5.2)
Hand Guidance

- ✓ speed
- ✓ devices

SSM (§5.5.3)
Speed and
Separation
Monitoring

- ✓ position
- ✓ speed
- ✓ sensors



PFL (§5.5.4)
Power and Force
Limitation

- ✓ force
- ✓ speed
- ✓ momentum

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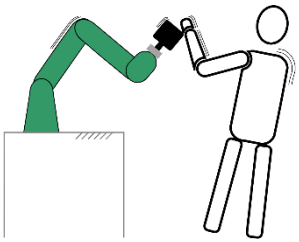

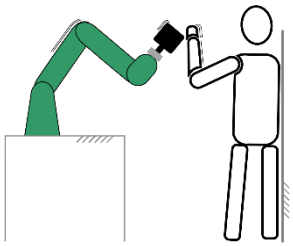

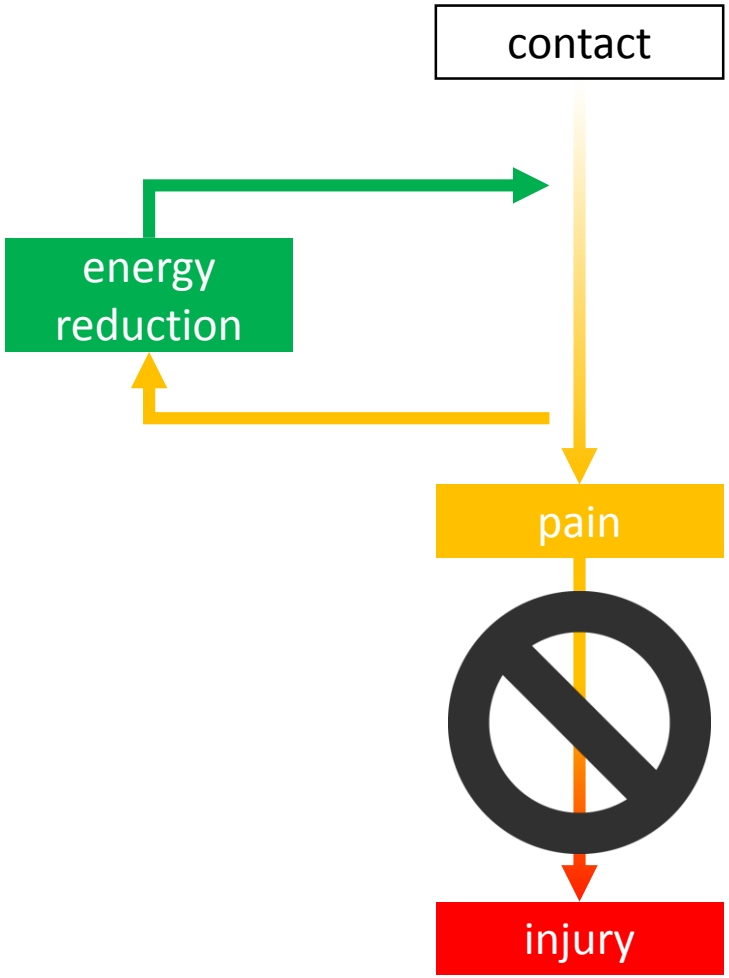

Annex I – 1.3.7
Risks related to moving parts

Threshold? Validation?

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standardization in robotics

activities

structure

- TC 299 WG3 (since 1/1/2016 – formerly TC 184/SC2 WG3)
- TC 299 other WGs

- CT24 GL09 (since 2017 – formerly UNINFO)

- CEN ?

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TS 15066

TR 20218-1

TR 20218-2

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2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

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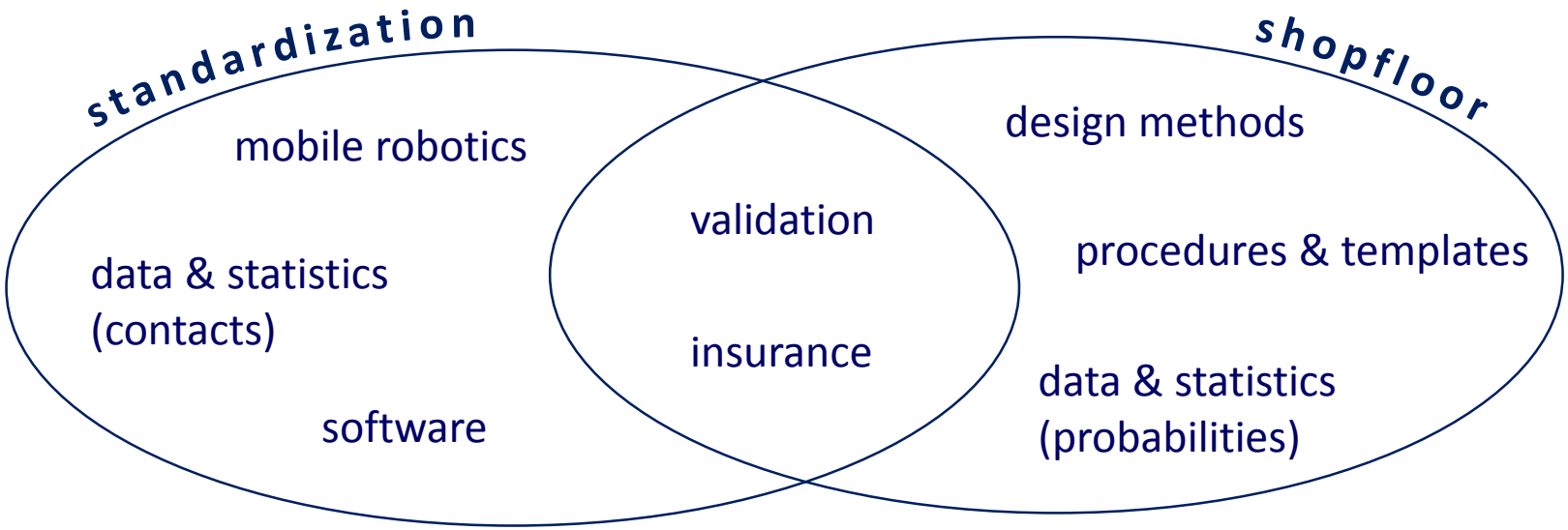
gaps



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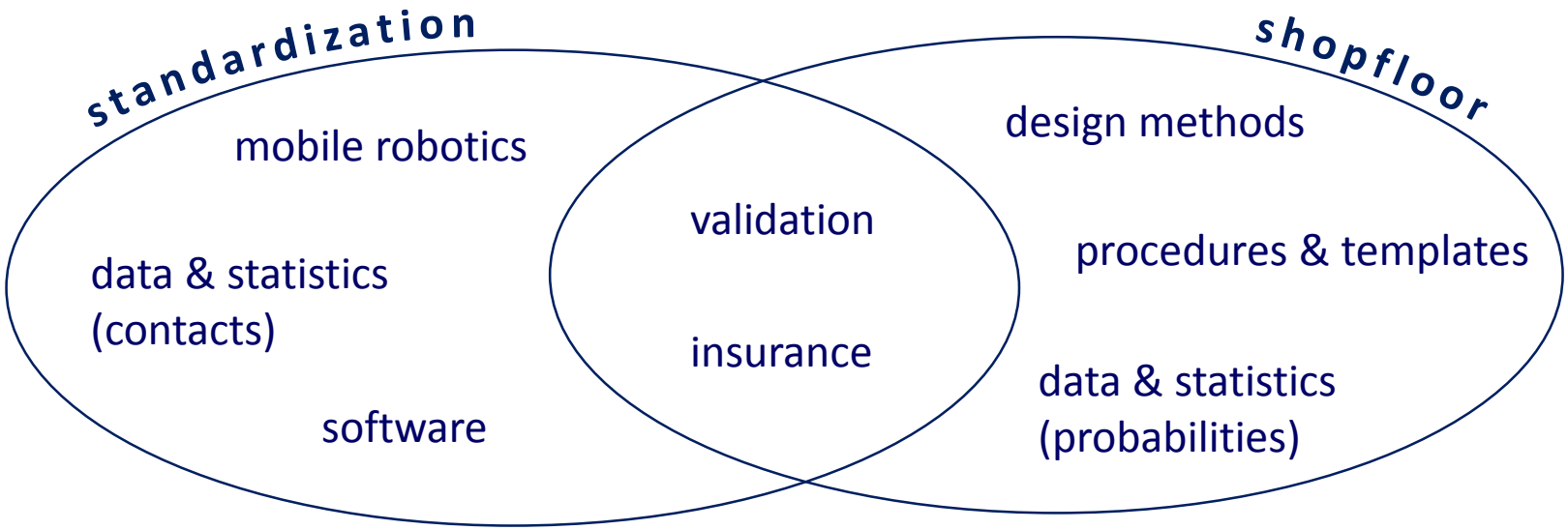

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