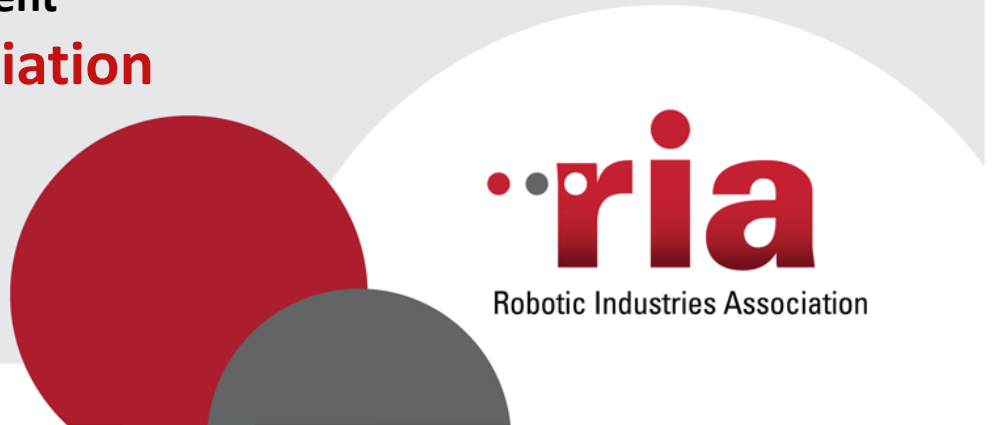
Robotic Industries Association: Robot Standards

Carole Franklin
Director of Standards Development
Robotic Industries Association



Robotic Industries Association (RIA)

Today's Topics:

- About RIA
- About RIA's Standards
  - History
  - RIA's Foundational Standard: Safety Requirements for Industrial Robots and Robot Systems
  - Additional Standards Documents for Robot System Safety
- Definitions
- Resources

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About RIA

- Founded in 1974
- Daughter organization of A3 – the Association for Advancing Automation
  - > 1,200 member companies
  - Largest automation trade group in North America, and number 2 in the world (second to only VDMA in Germany)
- Leader in robot standards development since 1982
  - ANSI, ISO primarily

RIA's Role in Robot Standards

RIA Standards Development Committee (SDC)

- RIA Members

ANSI: R15, Robotics Standards in the U.S.

- *R15 Standards Approval Committee (SAC)*
  - **R15.06** Drafting Subcommittee
  - **R15.08** Drafting Subcommittee
- ANSI Committee members are *not* required to be RIA members

U.S. Technical Advisory Group to ISO TC 299 ("U.S. TAG")

- Administers ANSI's membership in the ISO TC 299, Robotics
- U.S. TAG members are *not* required to be RIA members

ISO Technical Committee 299, Robotics ("TC 299")

- **WG 1** – Vocabulary
- **WG 2** – Personal Care Safety
- **WG 3** – Industrial Safety
- **WG 4** – Service Robots
- **JWG 5** * – Medical Robot Safety
- **WG 6** – Modularity for Service Robots

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About RIA's Robot Standards: Today

- R15.06-2012 > Direct U.S. Adoption of ISO 10218-2011. Safety requirements for industrial robots and robot systems.
  - RIA TR R15.306-2016. Task-based risk assessment.
  - RIA TR R15.406-2014. Safeguarding.
  - RIA TR R15.506-2014. Applicability for existing systems.
  - RIA TR R15.606-2016 > Direct U.S. Adoption of ISO/TS 15066:2016. Safety requirements for collaborative robots.
  - RIA TR R15.706-201X (In development). User Guidance.
  - RIA TR R15.806-2018. Test methods for PFL collaborative robot systems.
  - RIA TR R15.906-20XX (In development). Safety-related software.
- R15.08-20XX (In development). Safety requirements for industrial mobile robots

About RIA's Robot Standards: History

Year	Standard Document
1986	ANSI/RIA R15.06-1986
1992	ANSI/RIA R15.06-1992
1999	ANSI/RIA R15.06-1999
~2000	ISO 10218 begun, based on R15.06-1999
2006	ISO 10218-1:2006
2007	ANSI/RIA ISO 10218-1:2017 & RIA TR to enable its use
2011	ISO 10218-1,2:2011
2012	ANSI/RIA R15.06-2012 (U.S. national adoption of 10218-1,2:2011)
2014	RIA TRs 306, 406, 506
2016	ISO/TS15066:2016; RIA TR R15.606-2016 (U.S. national adoption). TR 306 update.
2017	ISO/TR 20218-2:2017
2018	ISO/TR 20218-1:2018. RIA TR R15.806-2018.

RIA's Foundational Standard

ANSI/RIA R15.06-2012,

Safety Requirements for Industrial Robots & Robot Systems

- U.S. National Adoption of ISO 10218-1,2:2011
  - 10218 Part 1: Safety Requirements for Industrial ROBOTS
  - 10218 Part 2: Safety Requirements for Industrial ROBOT SYSTEMS and Systems Integration

ANSI/RIA R15.06-2012: Table of Contents

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RIA's Definitions

- **Question 1:** How does your group define terminology (e.g., ontologies, glossaries, something else)?
- **Question 2:** How do you define the following terms (as appropriate): robot, automated robot, teleoperated robot, environment, pose?
- **Question 3:** How did you determine these definitions (e.g., adopted from other standards, consensus among group members, something else)?

RIA's Definitions

- **Question 1:** How does your group define terminology (e.g., ontologies, glossaries, something else)?
- **RIA response:** English language/ natural language consensus definitions
  - **For the Broader Industry:** RIA/ A3 actively participates in IFR's vocabulary efforts
  - **For Standards:** RIA's Standards definitions generally follow R15.06/10218, + ISO 8373 where applicable
- **RIA Standards:** English language/ natural language consensus definitions
  - Consult ISO 8373:2012, Robots and Robotic Devices - Vocabulary
  - Consult ISO 10218-1,2:2011, Robots and Robotic Devices - Industrial robots and robot systems – Safety requirements

RIA's Standards Definitions

- **Question 2:** How do you define the following terms (as appropriate): robot, automated robot, teleoperated robot, environment, pose?

Term	Definition	Source
Robot	actuated mechanism programmable in two or more axes (4.3) with a degree of autonomy (2.2), moving within its environment, to perform intended tasks *[There are 2 Notes]*	ISO 8373:2012
Industrial robot	automatically controlled, reprogrammable (2.4), multipurpose (2.5) manipulator (2.1), programmable in three or more axes (4.3), which can be either fixed in place or mobile for use in industrial automation applications *[There are 4 Notes in the 10218 version]*	ISO 8373:2012; 10218-1,2:2011 (adapted)

RIA's Standards Definitions

- **Question 2:** How do you define the following terms (as appropriate): robot, automated robot, teleoperated robot, environment, pose?

Term	Definition	Source
Automated robot	We do not use this term; in our general usage, all robots are "automated"; autonomy is a key part of our conception of a "robot"	
Teleoperated robot	We do not use this term; the closest related terms are "teleoperation" (8373) and "manual mode" (10218)	
Environment	We do not use this term; the closest related term is "normal operating conditions" (8373)	

RIA's Standards Definitions

- **Question 2:** How do you define the following terms (as appropriate): robot, automated robot, teleoperated robot, environment, pose?

Term	Definition	Source
Pose	Combination of position and orientation in space *[There are 2 Notes]* *There are also a number of related terms, e.g., command pose, attained pose, path, trajectory*	ISO 8373:2012

RIA's Standards Definitions

- **Question 3:** How did you determine these definitions (e.g., adopted from other standards, consensus among group members, something else)?
- **RIA Response:** Adopted from ISO 10218 and 8373; participated in the development of the natural language definitions in 10218 by consensus among group members, which then fed into the first version of 8373.

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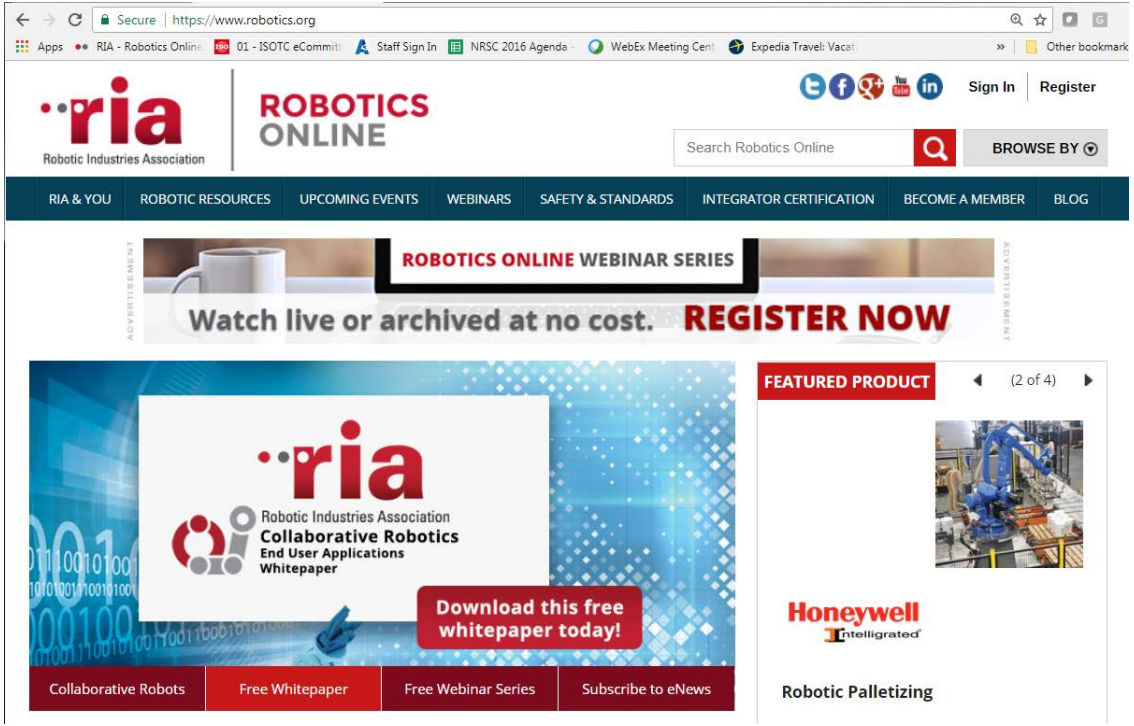
Resources: Robotics.org



- Feature Articles
- Safety Resources
- Webinars
- Supplier Information
- Certified Integrators Program
- Industry Event Schedule
- More!

Resources: Robotics.org/ Events

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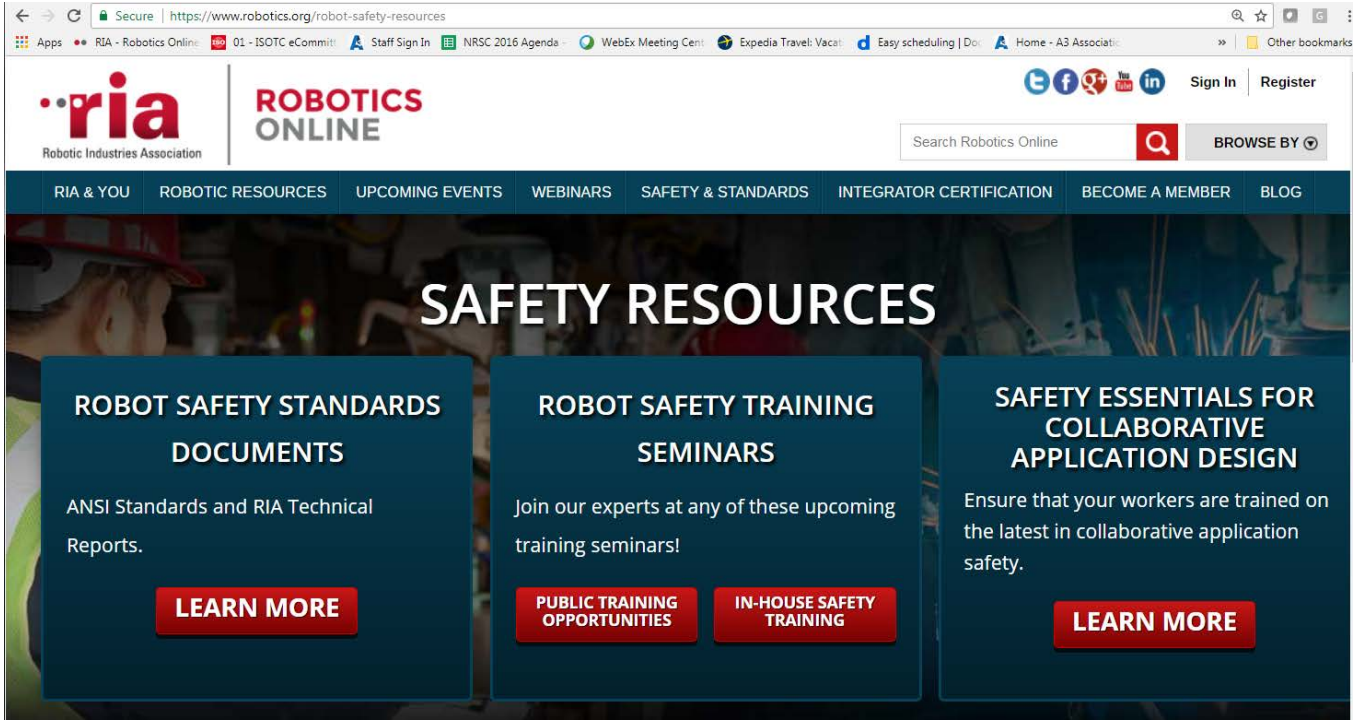
Resources: Robotics.org/ Safety Page



- Standards Documents
- Safety Seminars
- Webinars
- Risk Assessment Software

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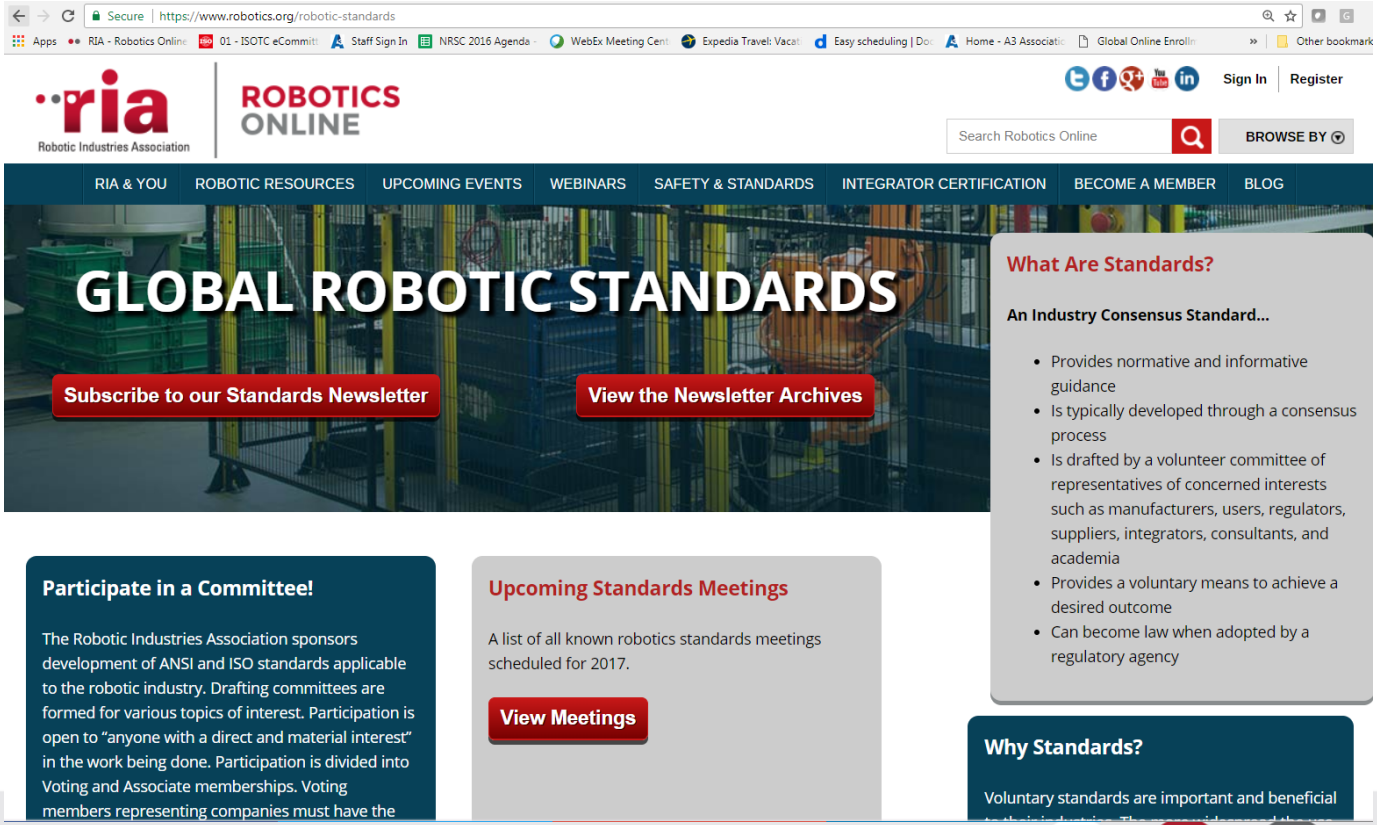

- Standards Newsletter
- Upcoming Standards Meetings Schedule
- Committee Application

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Questions About Standards?

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