MassRobotics AMR InterOperability Standard Implementation Steps

What are Standards?

- The process of standardization is the pursuit of conformity, with the objective of increasing the efficiency of economic activity

- Standardization affects both innovation and technology diffusion

- Standards can influence industry structure and help determine which firms benefit and which do not from technological change

- Standardization can and does occur without formal promulgation as a "standard"

MassRobotics AMR Interoperability Standard's Mission

The group's mission is to develop standards that will allow organizations to deploy autonomous mobile robots AMRs from multiple vendors and have them work together in the same environment, better realizing the promise of warehouse and factory automation. These standards will allow autonomous vehicles of different types to share information about their location, speed, direction, health, tasking/availability and other performance characteristics with similar vehicles so they can better coexist on a warehouse or factory floor.

Interoperability Standard's Design

- ## What It Does
  - Allow organizations to deploy autonomous mobile robots from multiple vendors and have them work together in the same environment
  - Defines a set of common shared information about location, speed, direction, health, tasking/availability, and other performance characteristics
  - Specifies a communications protocol

- ## What It <u>Does Not </u>Do
  - Impact Safety Standards for AMRs – will not duplicate efforts of ISO/TC 299 WG, IEEE RAS or A3
  - Ask suppliers to relinquish fleet management
  - Require a common map

Implementation Steps

1. Head over to AMR_Interop_Standard, review the README and the standard description document (AMR_Interop_Standard).

2. Implement an AMR sender (client), see the python example here: MassRobotics-AMR-Sender, but any language is acceptable.

3. Test the AMR client with a standard-compliant receiver; a node.js version is provided here: MassRobotics-AMR-Receiver.

4. Ensure that the messages coming from your client are properly populated with your robot's information and that they pass the schema validity checks provided by the receiver.

5. Congratulations! Your AMR is now compliant with the MassRobotics Interop Standard.

6. Email amrinterop@massrobotics.org to inform them that you are MR AMR InterOp compliant and put the MR Interop badge on your robots and website.

Interoperability Supporters and Next Steps

- Companies helping with the standard:
  - 6 River Systems
  - Waypoint Robotics
  - Seegrid
  - MiR
  - Autoguide Mobile Robots
  - Third Wave Automation
  - InOrbit
  - SVT Robotics
  - Open Robotics
  - Siemens

- More information: https://www.massrobotics.org/project/amrinteroperability/

- Technical details: https://github.com/MassRobotics-AMR/AMR_Interop_Standard

- Next up
  - Mission communication standard
  - Auto-charging standard

How can you help?

- As an OEM: Implement InterOp Standard and add that along with the rest of the capabilities of your products.

- As a user of AMRs: Favor the robots that implement InterOperability Standard for your operations.

- Inform us at amrinterop@massrobotics.org when you embed the InterOp standard so we can add your company to the InterOp list.

- Get involved and participate in subsequent version update efforts by reaching us at MassRobotics.

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