

ASTM International Committee F45 on Driverless Automatic Industrial Vehicles

<http://www.astm.org/COMMITTEE/F45.htm>

Mobile (rolling) robots have been around since about 1945 with the first automated guided vehicle in industrial use in the 1950's. Since then, advances in the industry and safety standards have been developed with no standardization for the performance of these machines. Mobile robots have been a part of the research community in most technical universities who have made tremendous strides in applying computer control to mobile platforms for use in many industries, including manufacturing, healthcare, and others. These implementations have helped drive the industry and safety standards such as ANSI/ITSDF B56.5 in the US and BS/EN1525 in Europe among others. As vehicles have become more capable with onboard sensing, large facilities have adapted to these machines to move materials in lights out conditions. However, adapting the vehicles to facilities has only minimally occurred, for example floor cleaning in open areas and delivering medications to nursing stations and patients in hospitals. For manufacturing in small to medium sized facilities, AGVs in their current form have not adapted well and therefore, may not be used.

A compilation of mobile robot challenge events, relative standards (such as search and rescue robots), and other research sparked a new standards thrust in performance of driverless vehicles applied to industrial use. As such, the new ASTM Committee F45 on "Driverless Automatic Guided Industrial Vehicles" was formed in 2014 and now includes mobile robot and AGV users, manufacturers, and research members from the USA, Europe, and Asia, currently from over 50 organizations. The new technical committee is scoped to include standardized nomenclature and definitions of terms, recommended practices, guides, test methods, specifications, and performance standards for automated guided vehicles towards advancing AGV capabilities for the manufacturing industry and others. The committee will address all of the areas that are important for potential AGV users to understand when making purchase and task application decisions. These areas, therefore, divided into five technical subcommittees:

F45-01 Environmental Effects

F45-02 Docking & Navigation

F45-03 Object Detection & Protection

F45-04 Communication & Integration

F45-91 Terminology

Real world situations have driven these categories and have uncovered generic performance test methods for simple comparison of vehicle performance that is expected to "set the performance bar" and improve the AGV industry as a whole. For example, improvements in tolerance (accuracy and repeatability), sensor integration, controls, and interoperability are just a few areas that may improve when performance is measured and analyzed through standard test methods. Committee F45 will provide information and guidance for AGV manufacturers and users through standard test methods that may also support the safety standards. For example, documenting how well the safety system measures an obstacle to be avoided, not just simply stop at the obstacle and wait, potentially causing slower production.

Three working documents are now being developed for Docking, Navigation and Terminology. A recent workshop was held at ICRA 2015 in Seattle called: "Autonomous Industrial Vehicles: From the Laboratory to the Factory Floor." The list of workshop presentations can be viewed and downloaded at: <http://www.nist.gov/el/isd/autoindvehiclesworkshop.cfm>. An ASTM book will soon detail extended workshop presentations and discussions. A full ASTM Committee F45 will be held August 24, 25 at the National Institute of Standards and Technology, Gaithersburg, Maryland, USA where all sub-committees, except Terminology, will meet and discuss each technical area's direction. The meeting will also include demonstration of an AGV and a mobile robot executing draft test methods.

For more information about participating in and joining ASTM Committee F45, please visit the above website or contact Roger Bostelman (roger.bostelman@nist.gov, 301-975-3426) or Pat Picariello (ppicariello@astm.org, 610-832-9720).