

# Cleaning equipment-maker hopes to introduce industrial-sized Roomba-like floor scrubber

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New robotics technology is seeping into every part of manufacturing - even the cleaning of the factory floors and assembly lines.

Nilfisk, a cleaning equipment-maker based in suburban Minneapolis, and Pittsburgh company Carnegie Robotics LLC last month introduced one of the nation's most advanced robotic floor scrubbers - one that allows a worker to program it and jump off for other tasks if necessary.

Nilfisk officials said there were even jaws agape during demonstrations of the Advance Liberty A50 Autonomous Scrubber last month at the ISSA/Interclean North America Trade Show in Chicago.

The new machines will be available for purchase by spring and will be made near the Twin Cities.

When driverless, the industrial-size Roomba-like machine employs sensors, cameras, software and lasers to navigate within 2 inches of walls and around furniture and other obstacles while simultaneously scrubbing and drying floors.

"It learns a space once the room's map is programmed into the machine, (so) it can go back and keep cleaning that space over and over again," said Carnegie Robotics spokesperson Jackie Erickson. "It knows its space, can perceive it and go."

Proprietary sensors and lasers not only allow the machines to clean very close to walls. They also can avoid touching a tennis ball and accurately track their cleaning paths so the scrubbers won't repeat previously cleaned zones, officials said.

"We are thrilled to launch the most advanced and easiest to use scrubber/dryer in the commercial

floor care industry," Nilfisk CEO Jonas Persson said. "Nilfisk has an unprecedented legacy of bringing ingenuity and innovation to market by way of products that improve and advance the industry. The Advance Liberty A50 is our most important product innovation yet, and it will set the standard and lead the way for intelligent equipment going forward" in the industry.

When using a driver, the A50 machine is designed to allow multitasking. The custodian, who rides standing on the back of the scrubber, can drive "manually" or set the machine to operate "autonomously."

Nilfisk and Carnegie Robotics' product brings the decades-old technology of chic driverless vacuum cleaners and robotic mail carts to the floor-scrubbing industry at a time when many commercial customers are increasingly interested in robotics and lowering labor costs.

If successful, the A50 will interest factories, warehouses, schools, hotels, clinics, hospitals and retailers, officials said, adding that they have not yet settled on a price.

Some competing products start at \$27,000 per machine.

Advance Liberty's debut comes at a time when competitors are racing to introduce machines with varying degrees of intelligent software. Intellibot, Discovery Robotics, Brain Corp., and Carnegie Mellon University's National Robotics Engineering Center all had products at last months' ISSA trade show with different automated features.

Tennant Co. was also at the trade show, displaying products with automated battery maintenance systems and other programmable

options. While it doesn't have a driverless scrubber yet, spokeswoman Kathryn Lovik said Tennant is working with a robotics expert and expects to launch its own "autonomous guided vehicle" in the next couple of years.

Market research firm the Freedonia Group recently reported that U.S. demand for janitorial equipment and supplies is expected to grow 2.2 percent a year to \$7.1 billion by 2019, mostly because of soaring demand for robotic floor cleaners.

Nilfisk officials are not put off. They believe Carnegie Robotics's sensing and floor mapping capabilities are best because the proprietary sensing technology has been tried and tested by the U.S. military and other customers.

That know-how is one reason Nilfisk began partnering with Carnegie Robotics nearly two years ago. (Nilfisk has been working on the product for three years.)

Six-year-old Carnegie makes advanced robotic sensors for defense, farm, mining and commercial customers. And now, "we have adapted military and space grade technologies to provide the Advance Liberty A50 scrubber with state-of-the-art perception and intelligent navigation," Carnegie Robotics CEO Steve DiAntonio said. "At the same time we've engineered a simple-to-use interface that enables flexible and efficient operation. ... (Carnegie) is excited to partner with Nilfisk to bring the most innovative and advanced scrubber to the commercial cleaning market."

Advance Liberty is just the start of something bigger. It is the first intelligent product to be marketed under Nilfisk's new global "Horizon Program." Nilfisk will work long term with Carnegie Robotics to develop more robotic products for the cleaning industry, officials said.

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