

SERVICE WITHOUT A SMILE



Manufacturing employees have always kept their eyes on the robotic systems that continue to pop up in assembly lines and industrial workspaces. These metallic, low-maintenance robotic employees don't waste time with smoke breaks or catching up on episodes of *Lost*. They tend to stick to the task at hand with little argument or attitude, giving human counterparts a bad name when they gripe about factory temperatures or lack of a decent dental plan.

The manufacturing industry was once the hot spot for artificial replacements, but in the near future it's the service industry that may see a significant increase in robotic employees. The Care-O-Bot 3 is an example of this kind of robot. Designed in Germany at the Fraunhofer IPA, (The Fraunhofer Institute for Manufacturing Engineering and Automation), the Care-O-Bot 3 is a mobile robot assistance system capable of planning and carrying out complex motion sequences.

The first Care-O-Bot prototype was built in 1988 and was able to navigate autonomously and safely indoors. The second prototype was able to manipulate simple objects found in home environments. Today, the third version, thanks to the help of sophisticated robotic components and equipment, can serve so many different platforms that it's really beginning to step into the realm of science fiction. Need a maid? Need a greeter? How about someone or something to set the kitchen table? Early prototypes of the Care-O-Bot have been used as museum guides and welcome robots or for advertising platforms and product presentations. The robot was designed to assist people in their daily lives while carrying out a wide variety of monotonous tasks. As a media manager, the Care-O-Bot can connect people to the outside world via telephone, television or interactive media. It can also provide mobility assistance to disabled or elderly people as an intelligent companion.

Schunk Inc. provided many of the key components for the

Care-O-Bot 3 from its own modular system, including the LWA 3 lightweight robotic arm (pictured above) and the SDH gripping hands.

"These units were selected due to their power density," says Jesse Hayes, product manager/automation components at Schunk. "This arm assembly is well suited for mobile robotic applications. It operates on a 24 VDC power supply and has no external controller, unlike traditional robots. The drives and motor controllers are located in each axis, and each axis communicates over a bus. The power is daisy-chained through the arm assembly."

Such factors allow the Care-O-Bot 3 to perform household tasks and grip objects including cups, plates or glasses and place them on the robot's removable service tray. The LWA 3 offers seven degrees of freedom and resembles a human arm in terms of its mobility. These capabilities will continue to push design teams further as they pursue the perfect automated companion that could be used in residential and commercial applications.

"Fraunhofer IPA is marketing the Care-O-Bot as a research platform for other universities to purchase so they can build a community of people to develop applications and software for service robotics," Hayes says. "Currently, service robots are mainly used in research and development applications in universities and government agencies in areas like hazardous waste cleanup, explosive ordinance disposal and close human robot interaction."

In time, you may find these humanoids retrieving your mail, cleaning your kitchen or fetching a cocktail during a summer party. It looks like as though the Roomba, the autonomous vacuum cleaner that first arrived in 2002, was just the tip of the iceberg. For more information on the Care-O-Bot research project, visit www.care-o-bot.de/english/.