



April 2002

Robots Break Out

By Stephanie Neil

Remember the days when the word "robot" conjured up the image of a wild-armed android wheeling around in circles bellowing "Danger, Will Robinson! Danger!" from a *Lost in Space* episode? Well, despite the fact that robot technology has undergone a remarkable evolution since the 1960s, manufacturers have yet to come to depend upon them as much as Will Robinson did.

Until now, robots have been embraced within the automotive and semiconductor industries for simple assembly applications. But even the inroads made within these sectors have not always brought the reliability and productivity enhancements expected from a robotic sidekick. That's why, when capital-budget cutbacks affect manufacturers, robots are often the first to go. But that's about to change.

New technology in the form of 3-D positioning systems, tight integration with motion control, smaller footprints, and built-in intelligence are positioning robots as the perfect companion in material handling, palletizing, and packaging applications. The technology enhancements make robots a good fit for environments where human safety is an issue, laying the groundwork to propel robots out of the traditional spot-welding tasks in the automotive space and into a variety of industries including food and beverage, pharmaceutical, and paper.

Smurfit-Stone Container Corp. (Chicago, IL), a leading integrator and producer of paperboard and paper-based packaging products, tried robots several years ago to find an efficient way to palletize empty bag tubes. The challenge was that the application required a pair of eyes to position the bags and muscle to transfer the bag tubes to the pallet. To solve the problem, Skip Poole, general manager for the bag packaging equipment group, thought of adding a 2-D vision system to the FANUC Robotics North America Inc. (Rochester Hills, MI) model S430 robot they were using. "But 2-D didn't meet our needs. It is not vigorous enough to handle all of the situations we encounter with packaging," he says. And 3-D, he thought, was too complicated and under-developed.

But then he was approached by an academic researcher who had invested more than a decade designing a 3-D positioning system that uses cameras, lasers, and Windows-based software to increase the range of recognition. "Two dimensions only allow you to work in two planes. But some of the issues in dealing with bag tubes have to do with height, locating front-to-back, and side-to-side," Poole explains. The 3-D software interprets the target and tells the robot how to tilt to accommodate the various bag tube orientations rather than relying on a fixed position for the target.

Poole spent two years integrating the untested technology with the FANUC robot controller. Now it is running successfully in one Smurfit-Stone plant in Florida. And since Poole's fateful encounter, the 3-D positioning technology has turned into a commercial product called MechVisual Palletizer from MechVisual Inc. (Park City, UT), a start-up formed this past December.

MechVisual is not to be confused with a parts-inspection 3-D vision system that relies on fixed points, warns the company's CEO Bruce Fryer. It's actually a non-calibrated positioning system. "We don't use external reference points, and we don't need to know where the thing is in relationship to the factory floor," says Fryer. "We're comparing the relative position between two objects in real time...That's why it is appropriate for material handling."

The solution has, in fact, been a boon to Smurfit-Stone. "The 3-D equipment ensures that every stack is done in the most efficient and optimum way," says Poole. New MechVisual customers will be able to add the positioning solution to a FANUC robot in a few days, because the controller handshaking has already been established. MechVisual is now in the process of extending the integration with ABB Group (Zurich, Switzerland), Motoman Inc. (Dayton, OH), and Kawasaki Robotics USA Inc. (Wixom, MI) robot controllers as well.

While Smurfit-Stone took a risk with a new technology, others are finding they can benefit from coupling proven technologies to increase flexibility. For instance, FKI Logistex (Danville, KY) has combined its gantry-style robots with a carousel and DVT Corp.'s (Norcross, GA) vision systems to build pallet loads that accommodate mixed layers of products.

Other high-speed pick-and-place packaging applications are emerging from companies like SIG Pack International AG (Neuhausen am Rheinflall, Switzerland), which pulls together motion control, drives, motors, conveyors, and software for a total solution for the food packaging industry. Meanwhile, a company called Barrett Technology Inc. (Cambridge, MA) has devised a high-performance manipulator that uses force sensing to adjust its grip depending on an object's properties such as size and weight.

The more cutting-edge applications will take a while before they proliferate, says Dick Slansky, a senior analyst at ARC Advisory Group (Dedham, MA), but some of the high-speed packaging technologies will make their mark in the manufacturing environment soon. "High-speed installations of robots and vision

have been going on for a long time in the electronic component industry, but it is starting to branch out to other verticles," he says.

Or, in the case of new Intelligent Assist Devices (IADs), it may get back to the matter of safety. For instance, Cobotics Inc. (Evanston, IL) brings speed and precision to difficult-to-move items by enhancing human movement with computer-controlled machinery. "IAD is using sensors that interpret a human's intent," says Stephen Klostermeyer, vice president of marketing at Cobotics. It is an advanced motion control system utilizing a combination of intelligent micro controllers, servo motors, and proprietary intent sensors to provide higher performance to ergonomic lift-assistant equipment. IAD adapts to the randomness of the human process by using a control interface and eliminating buttons to control the machinery.

Solving the safety issue is one of the reasons to invest in IAD, "but the real big driving factor is productivity," says Klostermeyer. "Our customers say the IAD equipment doesn't slow them down."

With all of these advancements and new integration combinations, there is no question that robots will soon be making a difference to those manufacturers who until now have been "lost in space" when it comes to using robotics. MA

*Reprinted from Managing Automation April/2002 © 2002 Thomas Publishing Company