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## Massachusetts' robot invasion Trade show highlights advances in building intelligent machines

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By Hiawatha Bray, Globe Staff | May 14, 2007

If the robots ever do rebel against their human masters, the trouble is likely to start somewhere in Massachusetts.

Without much fanfare, the Bay State has become a world leader in robotics. Many of these machines will be on display tomorrow at the Hynes Convention Center, as Boston hosts RoboBusiness 2007, a major robotics trade show.

Among the local companies in the field, iRobot Corp. of Burlington has sold millions of its floor-cleaning robots to ordinary consumers, while also producing hundreds of military PackBot machines serving on the battlefields of Iraq and Afghanistan. Foster-Miller Inc. in Waltham also serves the military market with more than 1,000 of its Talon robots. In Tyngsborough, Black-I Robotics Inc., founded by a man whose son was killed by a roadside bomb in Iraq, is putting together a cut-rate machine called the LandShark. It's designed to do everything from defusing bombs to hauling wounded soldiers to safety, and at a bargain-basement price of \$25,000 per unit, compared to \$56,000 to \$120,000 for an iRobot PackBot.

In the Pocasset section of Bourne, Hydroid LLC produces submarine robots that can detect underwater mines, measure water pollution, or keep tabs on the codfish population. But Hydroid doesn't have the ocean to itself. Bluefin Robotics Corp. of Cambridge, founded by Massachusetts Institute of Technology researchers, makes its own line of torpedo-shaped nautical robots.

Massachusetts is also a haven for biotech robotics. Caliper [Life Sciences Inc.](#) of Hopkinton is a leading maker of robotic equipment used by pharmaceutical firms for large-scale drug testing.

Joyce Plotkin, president of the Massachusetts Technology Leadership Council, said that the state has 150 companies involved in some aspect of robotics. These companies employ about 1,500 people in the state, and generate about \$250 million in revenue.

"We have health care robotics, marine, defense, consumer, industrial automation," said Plotkin. "I don't think other places have the diversity of robots that we have."

The RoboBusiness show is expected to attract about 1,000 guests and 65 exhibitors from around the world. While many are from Massachusetts, the show will also feature robotic gear from South Korea, Japan, Germany, and France. Far from a starchy gathering of gearheads, RoboBusiness is a business development event. Hardware and software makers come to meet, greet, and perhaps make lucrative connections in an industry that's enjoying a growth spurt.

"I think this marketplace could be anywhere from \$5 billion to \$8 billion in five years," said Dan Kara, president of Robotics Trends, the Upton company that has sponsored RoboBusiness for the past four years.

Massachusetts will have to fight for its share of the bounty. There's plenty of robotics activity in California, of course. But perhaps the toughest rivals will be found in an unexpected place -- Pittsburgh. The former steel city has become a major source of robotic innovation, largely driven by researchers at Carnegie-Mellon University.

Kara thinks Massachusetts has the edge, because of its financial muscle. "We also have the venture capital here and the investment," he said.

And the people, according to iRobot chairman Helen Greiner. "There's a great influx of very, very smart

employees who want to do something that changes the world," she said.

Many of those people come from local universities. Pittsburgh has Carnegie-Mellon , but Massachusetts has MIT, Harvard, Northeastern University, Boston University, the University of Massachusetts, and other schools with strong academic programs in robotics. The lineup is about to get stronger, now that Worcester Polytechnic Institute is launching an undergraduate program in robotics engineering.

Acting director Michael Gennert said WPI's program is the first of its kind in the United States. Until now, would-be robot builders majored in computer science, electrical engineering, or mechanical engineering. WPI graduates will get basic training in all three specialties, because each is vital to robot design.

"This is going to be a very popular program," said Gennert. "We have students on campus now who are asking to change majors and become robotics engineers."

While colleges provide the brainpower, the wars in Iraq and Afghanistan have provided a patriotic and financial incentive for the state's robot boom. The iRobot PackBot and the Foster-Miller Talon were the first robots ever deployed in a combat zone.

"Prior to the war in Iraq, everybody made prototype quantities of robots," said Foster-Miller vice president of operations Robert Quinn.

But confronted by the peril of roadside bombs, the Pentagon began buying them in bulk for use by explosives disposal squads.

"The whole idea is put the robot in front," said Quinn.

Now these military-inspired technologies are migrating to other fields. Police use robots armed with Tasers or tear gas guns in hostage situations. Negotiators can talk to suspects through a robot's microphone and loudspeaker, with no risk .

"The hostage taker gives up because they can't win," said Quinn.

The success of iRobot's Roomba floor sweepers has proven that consumers will buy a cheap, reliable robot that does something useful. The company has since released a series of cleaning robots, but Greiner said iRobot can do more than tidy up.

"We've got two non-floor-cleaning applications coming out in the back half of the year," she said.

But the next great consumer breakthrough in robotics may come from the auto industry. Luxury carmaker Lexus has a model that uses robotic technology to let the car park itself. Other manufacturers like Audi have cars that hit the brakes if you get too close to the vehicle up ahead. [General Motors Corp.](#) has announced plans to begin selling in Germany in 2008 a car that will drive itself, guided solely by video cameras, lasers, and an onboard computer. It's a market worth billions, if the idea catches on.

But Massachusetts, an auto-industry backwater, could be left in the cold. The state could also lose out to Pittsburgh or the rival technologists of Northern California.

"I'd hate to be like the computer industry again where one time this area led the country, and it was usurped by Silicon Valley," said Robotics Trends' Kara, who fears that robots might not take over Massachusetts.

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