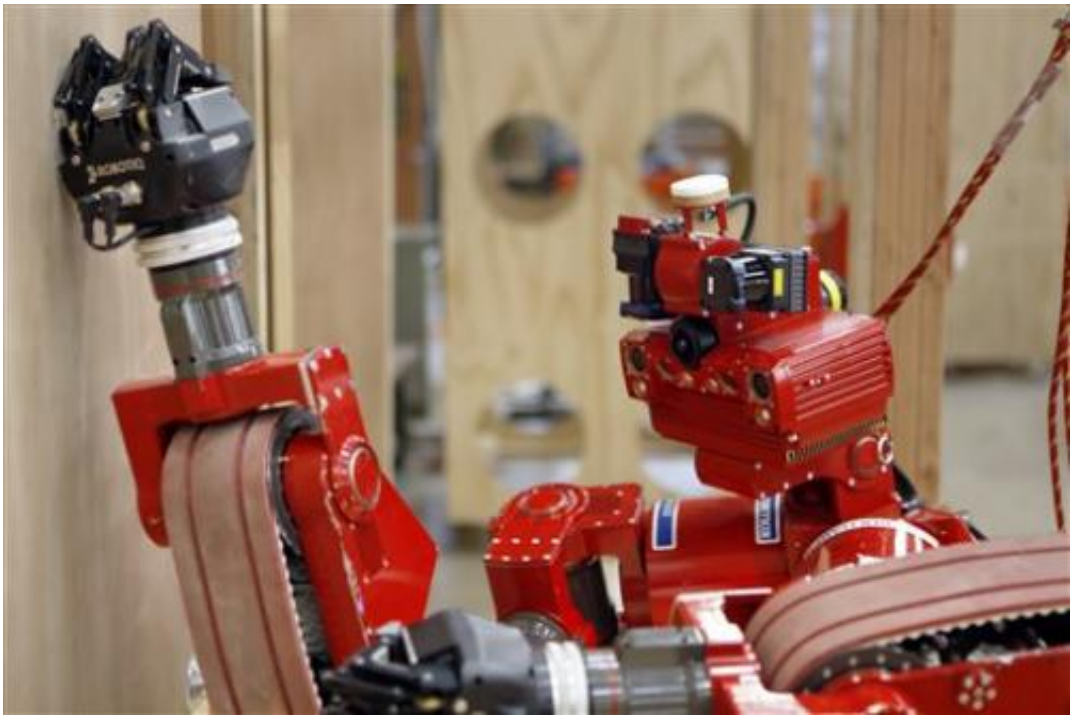
Maybe not sci-fi, but robots readied for big tests

December 15 2013, by Geoff Mulvihill



In this photo made on Wednesday, Dec. 11, 2013, the CMU Highly Intelligent Mobile Platform robot, known as CHIMP, performs a set of doorway tests during a preparation run at the National Robotics Engineering Center in Pittsburgh. Carnegie Mellon researchers are testing the new search-and-rescue robot that will compete in the U.S. Defense Department's upcoming national robotics competition in Florida. Competitors from other schools and companies will be vying for a $2 million U.S. Defense Department prize. (AP Photo/Keith Srakocic)

The real world has not caught up yet with "Star Wars" and its talking, thinking robots, but some of the most sophisticated units that exist are heading to Florida this week for a Defense Department-sponsored competition.

Seventeen humanoid robots will be evaluated Friday and Saturday at Homestead Miami Speedway for how well they can complete tasks including getting into an all-terrain vehicle and driving it and opening doors.

It's all stuff people can do. But the mission for the teams in the competition is to make robots that could function in disaster zones where the conditions could be threatening to humans.

It's advanced but not science-fiction. The robots, which move far slower than humans, are controlled by people telling them what action to take.

The top bots will move into the finals next year. The winning team gets $2 million as part of a project of the Defense Advanced Research Projects Agency.

The entry by defense contractor Lockheed Martin's Advanced Technology Laboratories, made with help from students at the University of Pennsylvania and Rensselaer Polytechnic Institute in New York, has been tested in an industrial park in Pennsauken, New Jersey.

The labs did well enough in the virtual version of the competition this year to be supplied a prebuilt robot and allowed to continue to this month's round of the DARPA challenge.

In this Wednesday, Dec. 11, 2013 photo, the CMU Highly Intelligent Mobile Platform robot, known as CHIMP, (CMU Highly Intelligent Mobile Platform) is put through some paces as it is switching the hold of a fire hose from one grasping unit to another at the National Robotics Engineering Center in Pittsburgh. Carnegie Mellon researchers are testing the new search-and-rescue robot that will compete in the U.S. Defense Department's upcoming national robotics competition in Florida. Competitors from other schools and companies will be vying for a $2 million U.S. Defense Department prize. (AP Photo/Keith Srakocic)

With the machine already built, Lockheed's team was responsible for the software. "We want the system to be intuitive to untrained operators," said Bill Borgia, the director of Lockheed's intelligent robotics

laboratory.

During a practice session last week, an engineer used a joystick and a computer mouse to tell the 6-foot (1.8-meter) tall, 300-pound (135-kilogram) robot where—and how—to move as it picked up pieces of rubble.

In this Wednesday, Dec. 11, 2013 photo, engineer Nick Letwin watches as the CMU Highly Intelligent Mobile Platform robot, known as CHIMP, is put through some paces as it pulls a fire hose from during a preparation run at the National Robotics Engineering Center in Pittsburgh. Carnegie Mellon researchers are testing the new search-and-rescue robot that will compete in the U.S. Defense Department's upcoming national robotics competition in Florida. Competitors from other schools and companies will be vying for a $2 million U.S. Defense Department prize. (AP Photo/Keith Srakocic)

In a real-life rubble removing situation, the controller might not be close to the robot. That is why the operators did their work from behind a black curtain. They had monitors to show the view from a camera on the robot, but they could not see the whole action from the outside.

The robot designed at Pittsburgh's Carnegie Mellon University is called CHIMP—for CMU Highly Intelligent Mobile Platform. It is just over 5 feet (1.5 meters) tall and is one of 10 robots that were designed and built from scratch over the last 14 months for the DARPA challenge. Other teams are using their software on robots supplied by DARPA.

Anthony Stentz is the director of the National Robotics Engineering Center at Carnegie Mellon and the lead researcher on CHIMP.

In this photo made on Wednesday, Dec. 11, 2013, the CMU Highly Intelligent Mobile Platform robot, known as CHIMP, finishes a set of doorway tests during a preparation run at the National Robotics Engineering Center in Pittsburgh. Carnegie Mellon researchers are testing the new search-and-rescue robot that

will compete in the U.S. Defense Department's upcoming national robotics competition in Florida. Competitors from other schools and companies will be vying for a $2 million U.S. Defense Department prize. (AP Photo/Keith Srakocic)

"We wanted to design a robot that had roughly human form, so that it fits in the environment that humans operate in. But we didn't want to take on the difficult task of building a machine that is too humanlike," Stentz said. For example, walking on two legs presents a major engineering challenge, so CHIMP rolls on treads, like a small tank. It has treads on its arms, too, and gets down on all fours to go over rough terrain.

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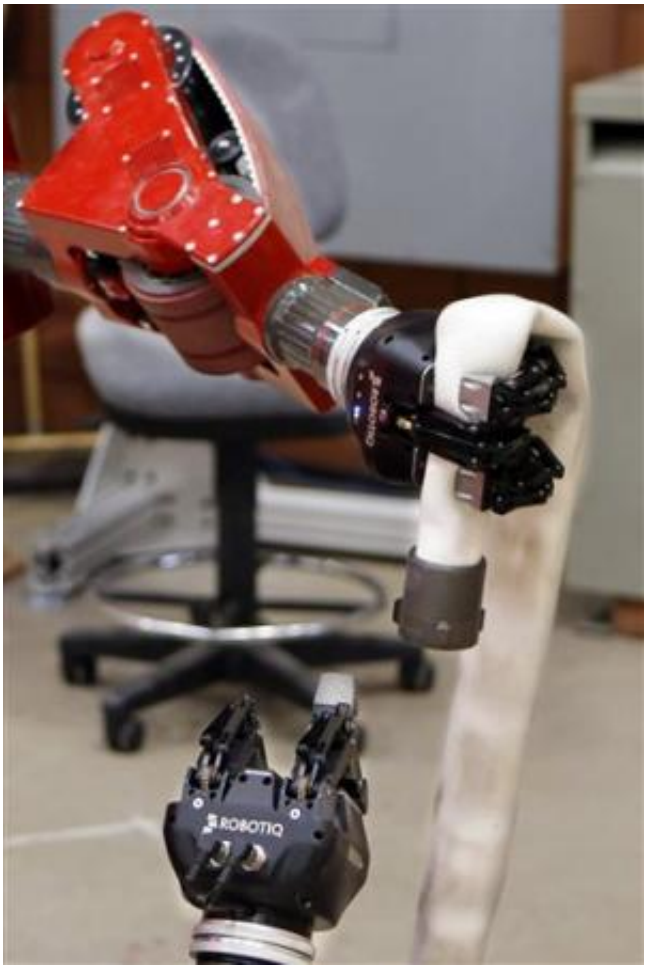
Like other robots in the competition, CHIMP gets some commands from humans but also has the ability to make limited decisions. "So we are telling it what to do, and it's deciding how to do it," Stentz said.

In this photo made on Wednesday, Dec. 11, 2013, robotics engineer Jordan Brindza explains how he and the team use multiple computer displays to make sure the CMU Highly Intelligent Mobile Platform robot, known as CHIMP, operates properly at the National Robotics Engineering Center in Pittsburgh. Carnegie Mellon researchers are testing the new search-and-rescue robot that will compete in the U.S. Defense Department's upcoming national robotics competition in Florida. Competitors from other schools and companies will be vying for a $2 million U.S. Defense Department prize. (AP Photo/Keith Srakocic)

Stentz said many people don't really understand how difficult it is to get a machine to do even simple tasks. Robots excel in doing particular things such as welding a car part on an assembly line. But search and rescue missions take place in vastly different and constantly changing environments.

During practice runs at CMU, it took CHIMP several minutes to open a door or attach a fire hose to a water faucet. While less exciting than fictional robots' capabilities, those tasks are more complicated and varied than robots usually do, such as vacuuming a room.



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"We think that the public ends up with a sense that robots are far more capable than they are," Stentz said of how Hollywood portrays the machines.

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