DARPA to Atlas contest hopefuls: Time to cut the cord

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Super Bowls. World Cups. Marathons. Wimbledon. Months and days are marked off by fans and supporters for big events and, for robotics watchers, June cannot come fast enough. The DARPA Robotics Challenge Finals will take place June 5 to 6, 2015 at Fairplex in Pomona, California and DARPA news for the Atlas robots has emerged on what fans can expect to see. Seven of the robots in the competition are of the Atlas type, i.e., seven teams are using an updated Atlas. As much as 75 percent of the Atlas is new, from the knees all the way up. Only 25

percent of the robot is from the old Atlas.

Expect more energy efficiency, more dexterity, and much less noise. The robot is also stronger, so it can better get itself off the ground in case of a fall. The arms have been repositioned; the shoulders were flipped over; the arms come out from much lower on the robot. This allows users more work space in front of the robot so it can see what its hands are doing. The robot's wrist degree-of-freedom has changed to the point where the robot will be able to turn door handles simply by rotating its wrist instead of having to move its entire arm. The upgraded robot is 6-foot-2 (1.88 meters) and weighs 345 pounds (156.5 kilograms).

Gill Pratt, DARPA Robotics Challenge program manager, commented on Atlas Unplugged: gone is the tether. "We have to cut the cord," said Pratt. "We have to no longer rely on the safety line on the top but we will continue to use them during testing." According to DARPA, teams are likely to keep their robots connected to fall arrestors in the months that remain before the big event, to safeguard against damage. Pratt said risk mitigation was part of the game, and the teams could decide what chances they were willing to take during training, "but come the DRC Finals, the cords are cut." The safety line will no longer be there. Atlas robots will have to operate completely without wires—they may not be connected to power cords, fall arrestors, or wired communications tethers. Teams will have to communicate with their robots over a secure wireless network.

Joe Bondaryk, project manager, Boston Dynamics, which did the robot redesign, also talked about the new Atlas. "The teams will have quite a job over the next three months," he said, "to get re-acquainted with the new Atlas Unplugged." In back of the robot is a large box which represents all the energy that the team will have to work with during the entire DRC finals. The battery (Lighter materials allowed for inclusion of a battery and a new pump system with only a modest increase in

overall weight) goes through a new distribution panel providing the power. The heart of the robot, said Bondaryk, is the pump, which is "very quiet" and makes the robot a lot quieter. The teams do not need hearing protection. It's a pressure pump, he said, that will allow the teams to change and decide what pressure they will use on the robot during any of the tasks in the competition. This will allow them to save battery power. A set of computers on top will be used by the teams to process images out of the sensor head and then command the robot to do its tasks.

The DRC is a competition of robot systems and software teams to develop robots that are capable of assisting humans in responding to natural and man-made disasters. The challenge was designed to be extremely difficult. "DARPA has been consulting with our international partners to decide on what steps we need to take to speed the development of disaster-response robots, and the DRC Finals will reflect those realities," said Pratt. What makes it also interesting is that teams are innovating on a short timeline to enable their robots' capabilities to complete challenge tasks selected by DARPA for their relevance to disaster response.

More information: www.theroboticschallenge.org/

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