Robots duke it out in Germany for RoboCup

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In 2050, soccer and robot fans may soon be rooting for their favorite teams in a Cup game of human world soccer champion teams vs. a team of fully autonomous humanoid robots -- that's at least the ultimate vision of the RoboCup Federation.

But until then, as soccer fans in Germany eagerly wait to see which two teams advance to play for the World Cup, a different set of players are competing in Bremen, Germany, this week for a competition known as RoboCup World Championship 2006.

The 10th annual championship in Germany marks a first in the country since the competition was initiated in 1997 in Nagoya, Japan, and has been held thereafter in Italy, Korea, and Portugal to name a few.

Since its initiation, the research and education project has made progress in its aim at using soccer to foster artificial intelligence and robotics research in a wide range of technologies.

And this year's competition from June 14 to 20 will feature more than 440 teams -- 2,500 participants -- from some 40 countries of which only 33 teams will win, competing in the three arenas of soccer, rescue and RoboCupJunior in leagues and sub-leagues for soccer simulation, small-size robots, middle-size robots, four-legged robots, humanoid robots, rescue simulation, rescue robot, and junior.

"This is a humongous event," said co-chair organizer Ubbo Visser from the University of Bremen, Germany, who told United Press International

that they've been planning for the event in Germany since 2003. "Everything is going smoothly as far as the organizers go. Some people are scared as far as competitors go, feeling not ready and last minute changes -- but in the end, they are all ready."

But fine-tuning software, integrating artificial intelligence and robotics in fields outside their expertise, damage control from shipping mishaps, and added changes in the playing field, are among some of the problems that send competitors into a frenzy just days before a competition, according to Visser.

"If one module doesn't work, you're whole robot doesn't work," Visser said, "So one of the biggest fears for developers, is if one part isn't working."

"Competitors don't stop working," he added. "Champions don't come already done, they improve upon and further develop their software over the period of the competition -- it's a rule of thumb."

But as far as challenges go, the most challenging is enabling robots with automation for real -- life environments.

Dr. Peter Stone from the University of Texas at Austin says that new challenges in the environment are pushing teams to overcome other problems in order to advance the technology, such as finding solutions for visual perception so that robots can use a black and white ball instead of orange or perform in natural lightening.

Stone, also a RoboCup Trustee, is competing this week and is the founder and team leader of the Austin Villa robot soccer teams which will play in the soccer coach simulation in which their coach agent tries to improve the performance of team of agents by giving strategic suggestions via a standardized coach language as well as in the Sony

Aibo four-legged leagued that require solving the problems of vision, localization, locomotion, and coordination.

The Sony league in particular has added challenges, according to Stone, who says the field has gotten much bigger, there are more robots, and the walls in which balls can bounce off have been taken down.

"It encourages a more controlled play ... and enables teams to become more innovative than the year past," he said.

"The soccer league provides us with a good way to get into the strategic aspects of soccer," also said Stone, emphasizing that soccer allows scientists to test robots when it comes to behavior and movement but is also feasible and understood being the most popular sport other than the United States. "Some of the most motivated and innovative people are in this competition, trying to get to the top."

"It's more than just stress, it's a lot of fun," Stone added. "There's no other time in academia where people are jumping up and screaming, there's a lot of excitement and camaraderie. It's a community building event ... and pushes the future of the science."

Fellow RoboCup Trustee and assistant professor at Georgia Tech whose research includes autonomous robots, social animals and multi-robot teams, Tucker Balch says that the teams have been getting better and better each year.

Georgia Tech's College of Computing will be hosting the RoboCup 2007 from July 1 to July 10 in Atlanta, where Balch will chair the event.

"The most amazing thing is that you watch these robots play and they seem so alive -- that's the most significant thing I've noticed in the last year, they've really switched from being robots to being alive," Balch

said. "Our focus is on developing the best AI software, the robots are autonomous and have become more perceptive of their environments, and it's more complicated (with a team) than producing a single robot, they really are using wireless digital capabilities to communicate with each other."