

> Editor's Page

By Mark R. Howard
[mhoward@floridatrend.com]



Tech Jewel

In December, at the Homestead-Miami Speedway, 14 of the most sophisticated robots in the world will compete in a simulation of how humanoid machines — think Terminator, not an auto-assembly line welder — could be used to respond to an event, like the disaster at the Fukushima Daiichi nuclear plant, where it's unsafe or impossible to send in human beings.

Each robot, controlled by a human team, must climb into a golf cart-like vehicle and drive to a simulated reactor building. The robot must get out of the car, make its way across a debris field strewn with cinder blocks, remove debris blocking an entryway, open a door, climb a ladder, break through a wall, close valves and then attach a fire hose to one of them.

If that sounds easy, then you've been watching too many *Transformers* movies. Many of those tasks, individually, are beyond the current state of the robotics art. Collectively, they represent huge engineering and programming challenges for the competing teams.

The competition is being staged by the Defense Advanced Research Projects Agency, the organization that's tasked with keeping the U.S. technologically superior to the rest of the world, particularly militarily. DARPA works way beyond the cutting edge. The agency — or research it has funded — is responsible for developing the internet, the GPS system, the voice-recognition technology that led to Apple's Siri, "cloud" internet data storage and stealth technology for U.S. fighters and bombers, among others.

At the December competition, seven of the 14 robots will be custom projects created by the institutions that developed them. The other seven will be identical "Atlas" humanoids provided by DARPA to the top seven teams from a preliminary competition in July — DARPA wants to see how the best seven teams do with the same platform.

The roster of teams is a who's-who of world-class tech institutions: MIT, CalTech, NASA's Jet Propulsion Lab and Lockheed Martin, as well as top-tier institutions from abroad. And along with the Goliaths, there's a David, a world-class institution from Florida — the Florida Institute for Human and Machine Cognition. And it may well win.

IHMC, founded in 1990, is one of the state's most underpublicized tech jewels. It has always suffered from low visibility, in part because it came out of northwest Florida and in part because of its name, which is a mouthful but accurately describes what it does — broadly, any research that can help people interact more effectively with machines to leverage our human capabilities.

So, for example, the institute has a project involving control-panel displays in aircraft, replacing the traditional blizzard of dials and gauges with a unified display organized

to help pilots make better decisions faster. The institute works in artificial intelligence, computer security, human language understanding by computers, and robotics, including a project with NASA to develop a "powered exoskeleton" — robotic devices that are attached, Ironman-like, to the limbs of a disabled person to enable movement.

Ken Ford, one of IHMC's founders and its CEO, has structured the institute so that bureaucracy doesn't get in the way of science. On the science and technology staff, the institute has no departments, no standing committees and no administrators or middle managers, whom Ford calls "vacuum cleaners of passion."

Each scientist, Ford says, is an entrepreneur who must attract funding to support his or her work. IHMC, with about 70 scientists, leverages \$2.6 million in state funding each year into about \$25 million. Once a part of the University of West Florida, IHMC now operates as an independent non-profit research entity of the State University System. From offices in Pensacola and Ocala it collaborates with several state universities as well as other research institutions like the Moffitt Cancer Center.

Ford says IHMC does no strategic planning, avoiding the game of trying to identify "hot" research fields and then competing against the likes of MIT for scientists in those areas. Instead, he says, IHMC gets its direction from hiring the right people and turning them loose. His recruiting efforts, he says, boil down to looking for "remarkable people whom we think would be wonderful colleagues."

It's an approach that generates serendipity. Case in point: Ten years ago, Ford says, the field of humanoid robots was completely out of vogue. But when he had an opportunity to hire Jerry Pratt, "one of the best people in the field," Ford took it. Another leading roboticist, Peter Neuhaus, came the following year. Since then, humanoid robotics has become "super hot," he says, and the institute finds itself in a sweet spot. Pratt and Neuhaus are key players on the 22-person IHMC team that will compete in Homestead in December.

In making it to Homestead, IHMC's robotics group competed against a field that originally included 100 teams. In July's preliminary, the institute finished first among seven semifinalists, scoring nearly twice as many points as second-place MIT. This, as Ford says, is a big deal.

And so is IHMC, one of only a few research efforts in Florida that are truly world class, and the only one that is breaking ground not just on the research it does, but how it organizes itself to get that research done. It's something for the state to keep in mind as it considers the how-much and where of research funding.

Meanwhile, in December, root for the Atlas being run by the guys from Florida.