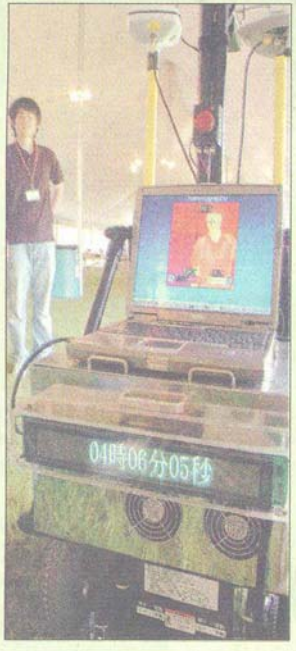
OU Holds Robotic Contest



By Gerald Scott
Staff Reporter

Somewhere, Isaac Asimov must be smiling at the 2007 Intelligent Ground Vehicle Competition (IGVC). The spirit of the late sci-fi author's "I, Robot" philosophy about the practical development of autonomous vehicles was playing itself out at Oakland University June 8 -11, when several hundred college students from two-dozen universities descended on Rochester for the annual competition.

The IGVC is one

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HOSEI UNIVERSITY engineering student Hidenobo Sakazaki with the robot he and his classmates built for the IGVC at OU.
– photo: Bruce A.Pollock

COLLEGE SENIORS from California State, Northridge struggle to get their robot to run a given course and stay within the painted lines. – photo: Bruce A. Pollock

International Teams Enter OU Robot Competition

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of three such academic competitions for college students to develop autonomous field robots that were founded by the Association for Unmanned Vehicles back in the 1990s. Although not as famous as the SAE Formula mini-race car student competition, IGVC has grown and prospered in its 15 years and is fulfilling its mission of developing young engineers with an edge in robotic mobility.

The event is important enough to be sponsored by the U.S. Army's TARDEC, which is the engineering arm of the TACOM base in Warren, where intense engineering work on developing military robots for field use in Iraq and Afghanistan is currently being conducted.

"TARDEC and Oakland University are the hosts of the competition," said Bernard Theisen, community outreach program manager for TARDEC's Joint Center for Unmanned Ground Vehicles. "The goal of the competition is to foster the development of undergraduate students in order to help develop the technical base in the U.S. The competition is not pushing the cutting edge, but there are a lot of practical applications in use with the ground vehicles that you also see in the current auto industry such as lane departure and early (crash) warning sensors."

The student teams, including the University of Detroit Mercy, Lawrence Tech, Minnesota, Michigan, Texas, Wisconsin and others, bring a fresh approach to coaxing "smart mobility" out of these field robots, which often look like a combination of a Rube Goldberg machine mixed with NASA's Martian rovers, "Spirit" and "Opportunity." The vehicles run on anything from gasoline to hydrogen power to solar cells. The object is to negotiate a field obstacle course while recognizing natural and man-made hurdles put in front of the machines, as well as to recognize chalk lines that keep the machines in the bounds of the field competition.

This from the rulebook: "Obstacles on the course will consist of various colors (white, orange, brown, green, black, etc.), five-gallon pails, construction drums, cones, pedestals and barricades that are used on roadways and highways. Natural obstacles such as trees and shrubs and man-made obstacles such as a light post or street signs could also appear on the course," it reads.

University teams often give their field robots amusing names tied to their school's athletic team nicknames or other titles that are derivative of its parts – and occasionally they give a nod to pop-culture, such as Minnesota's "Awesome-O," which is in fact a robot and not a fourth-grader in a cardboard box. Texas' is "BlastyRAS," Cincinnati is the "Bearcat Cub," U-M Dearborn's is "Wolf" and Lawrence Tech's is named the "H2Bot2," if only because it runs on a hydrogen fuel cell. Bob Jones University, a devout Christian school in South Carolina, came to town with Balthasar, a robot named for one of the three Wise Men of Bible fame (Gaspar and Melchoir were the other Wise Men, for those keeping score).

The IGVC competition area covers an entire field at the far northeastern end of the OU campus, past the entrance to the MeadowBrook Music Festival, with tents and various obstacle courses set up for the students to use. New York City College student team leader Luis Pazmino explained the evolution of his team's robot, which is nicknamed the "Beaverbot," derivative of NYCC's athletic teams, the Beavers.

"We have a differential drive motor, differential drive system, which means that the wheels spin independently of each other. There is one motor per wheel. How we command rotation is by accelerating one wheel more than the other one, or in the opposite direction ... that achieves turning. We're using a camera to detect lines. We also have a small laser scanner that detects obstacles," Pazmino said.

"For robotic vision, we use a common webcam, it's about $40, you can buy it anywhere. The 'bot is run from a Dell Latitude laptop. We have some people from engineering, some from the arts, some from mechanical engineering. This is our first year, we're doing trials to qualify, so far we've had some problems with the turning. We're trying to turn the wheels 30 degrees but they're getting stuck. We're trying to fix that. Other than that, we recognize lines, we recognize the obstacles, we have the right outputs.

"We spent $15,000 but if you buy all the parts in the market, it's (less). We had a discount from Novatel, one of our sponsors, that is usually (a GPS sensor for) $6,000 but we got it for $3,000. So without discounts it's $15,000 and with discounts it was about $10,000. We brought seven students to Michigan, but our team is composed of 18 people. We couldn't bring everybody because of budget, but the seven crucial ones that developed the algorithms and the mechanical systems are here. The leaders of each sub-team are here. Most of us are electrical engineering. We translate the signal into the actual voltage."

For Michigan-based schools, family, friends, fellow students and either faculty or administrators show up to support their teams. Dr. Leo Hanifin, for example, is the dean of UDM's College of Science and Engineering and attended to cheer his robotic student Titans on.

The Grand Award winners at the 2007 IGVC were as follows: 1) Virginia Tech - "Johnny 5"; 2) Hosei University of Tokyo - "Omnix 2007" and 3) University of Detroit Mercy with "Capacitops."