

A mind of its own

By KYLENE KIANG The Daily Sentinel

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The Mojavaton, a 2001 white Nissan Xterra, can drive down the road, park, make U-turns and merge into traffic all on its own. But don't call him Herbie just yet.

Although the car might seem like it has a mind of its own, it actually follows a "very strict" computer program, Mojavaton team leader Jim Crittenden said.

The vehicle will represent Colorado in the 2007 Defense Advanced Research Projects Agency, or DARPA, Urban Challenge.

The event, to be held in a location to be determined, is a 60-mile race where vehicles must drive on their own among other autonomous vehicles and navigate safely through various traffic scenarios to the finish line.

In accordance with the competition's guidelines, the cars cannot travel more than 30 mph during the race.

"So when this leaves the starting line, it's completely on its own," Crittenden said. "If your car has a flat tire or crashes, that's the end of the race."

The DARPA Urban Challenge was formed after a 2001 congressional mandate set the goal of making one-third of military combat vehicles autonomous by 2015.

A more immediate goal is to employ the technology for use in military supply vehicles to protect soldiers from unnecessary risk, Team Mojavaton member Warren MacEvoy said.

"Most (military) deaths in Iraq happen when a soldier is traveling from A to B and runs over a bomb," said MacEvoy, a Mesa State College professor of computer science who assisted with the computer programming and mathematical analysis involved with the project.

"But the state of (artificial intelligence) today is not at the level where we would want to put an automated machine in combat or a situation where the lives of people are at stake," he said.

The 10-member Team Mojavaton is made up of two Mesa State College faculty members, one student and engineers and designers from the area.

The team finished in 13th place in the 2005 DARPA Grand Challenge in Nevada's Mojave Desert. The car's name is a combination of "Mojave" and "automaton," which is another term for an automated vehicle, Crittenden said.

Bringing new meaning to the phrase, "well-equipped sport-utility vehicle," the Mojavaton has been souped up with laser range finders, Global Positioning System antennas and stereo vision cameras. On the inside and outside of the vehicle are red kill switches, in case the "car goes crazy," team member Karl Castleton said. And mounted on the dashboard of the front passenger seat is a laptop computer, which team members use to monitor the car's data receivers.

MacEvoy said the vehicle's computer program was designed to work in a generic environment.

"You could say that the possibilities are infinite," he said. "(But) no censor is infallible. There's all sorts of unknowns that you have to deal with."

The vehicle negotiates its speed and steering 10 times per second, Crittenden said.

Some of the car's restrictions include not being able to sense traffic lights or signs. Right now, team members are working to improve the vehicle's ability to determine the flow of traffic in a four-way intersection.

"That's the one thing it has to do before DARPA officials decide we make it to the next phase," MacEvoy said.

The team will know if it qualified for the competition semifinals in August. Winners of the final competition in November can expect a \$2 million first prize from DARPA.

The team is extending an open invitation to schools that are interested in learning more about the Mojavaton. The automated vehicle will be visiting Grand Junction High School today.

"Anything we can do to encourage an interest in math and science is a good thing," Crittenden said.