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Twila Finkelstein of the UI's National Advanced Driving Simulator demonstrates how the program works on June 16 at the Oakdale campus. Hydraulic actuators in the place of wheels reproduce the interactions between road and tires, giving the driver a realistic feeling of being on a variety of surfaces, from pavement to gravel. Finkelstein normally sits in the back of the cab when subjects operate the simulator to monitor their safety.

Simulator driving ahead

Wesley Cropp - The Daily Iowan

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A major accumulation of debt and disorganized leadership plagued the UI National Advanced Driving Simulator - the top of its kind in the world - but program officials say reorganization and new opportunities are knocking on their door.

Since the program's revamping in March, it has been offering its services - at a price - to major motor companies and NASCAR drivers to wipe out the capitalized expenditures that previously drained its funds, new director Karim Abdel-Malek said on June 14.

The facility, which does research for the U.S. Department of Transportation, is responsible for some major changes in cars on the road, Abdel-Malek said. Currently, the UI engineers are studying electronic-stability control systems, which are available in every car in Europe but have yet to hit the United States.

"The systems compare what the driver is asking the vehicle to do with what the vehicle is actually doing," said Omar Ahmad, one of the simulator's top officials. They can apply brakes to individual wheels, which, in some instances, can even cut engine power, he said.

"We are doing research that would lead to the Department of Transportation deciding to send [electronic-stability control] to legislators," Abdel-Malek said. "They may say every car should have it."

"[Electronic-stability control] will be the most significant safety advance since the seat belt," said Garrick Forkenbrock, a research engineer for the National Highway Traffic Safety Administration. "It is expected to save more lives than airbags." He estimates that the technology could save 8,000 lives a year.

Data from studies performed by the national safety organization indicate that the system could reduce fatal single-vehicle crashes by 30 percent for passenger cars and 63 percent for SUVs, he said.

But despite the simulator's potential, it has been heavily criticized for consuming millions of UI dollars.

Abdel-Malek said the university contributed \$11.58 million in cost-sharing for the project, which was largely funded by the federal government.

The program, which began construction in 1998, became fully operational in 2001, Ahmad said.

Since 2000, however, the simulator has accumulated a \$7 million deficit, Abdel-Malek said. When it was first tested and everything checked out to be working correctly, a contract was signed, he said. But the document contained no warranties, leaving the UI to foot the bill for any repairs or upgrades. The simulator needs to run at approximately \$2.7 million a year to break even, he said.

"How we make our money at [the simulator] is by people driving it," the UI engineer said.

More specifically, profits come after contracted companies log hours specifying how much time they will need for their research. Over the last month, the simulator has logged 180 hours at a rate of \$1,000 an hour, Abdel-Malek said, and the simulator's financial situation is brightening.

"This year is guaranteed to break even," he said, "if the machine continues its reliability."

Since Abdel-Malek took over the program in March, he has focused on opening up and broadening its customer base - first from within the UI.

"One thing I did was invite faculty to be involved," he said Wednesday. "They're already bringing grants in from [the simulator]."

In addition, industry moguls such as Ford Motor Co. - whose officials toured the facility on June 14 - have become interested in the technology.

The simulation's quality is measured in percent fidelity, meaning how real it feels when you are using the system. Home video-game devices run at approximately 5 percent fidelity, and Ford's current simulators run at around 50 percent, Ahmad said. The UI facility, however, runs at 98 percent fidelity.

"Ours is the highest fidelity in the world," Ahmad said about the simulator, which mimics tire-soil interaction in real time.

"Companies are coming for the real-time simulation technology," Abdel-Malek said.

Ahmad said that in addition to the world-reknowned simulator, clients are drawn because of the UI's full-time experts at the facility. Professional drivers are also interested in capitalizing on the technology.

"A famous NASCAR driver flew in to drive two hours on it and then flew back" Abdel-Malek said. He said the driver is in discussion with UI researchers about re-creating a virtual race track and using the simulator as training.

With opportunities such as those that the simulator has garnered in recent months, some say it appears likely to rise above its deficits.

James Cremer, a UI computer-science professor, said the shakeup of leadership at the program has had a significant effect.

"The sad thing was that this great resource, with great people working there, was seen as a closed center," he said. "And now with the re-organization, its exciting to see faculty turning back to it and

realize its full potential."

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