



MSU Program Gives Nissan "Clear Vision"

With the exception of a home, a car is the most expensive purchase many people make. Because of the investment, car owners are quick to take advantage of the vehicle's warranty if they encounter a problem. As a result, automotive manufacturers are in constant need of better technology to ensure their products achieve the highest quality possible. One example of this technology is "Clear Vision," which was developed for Nissan by Mississippi State University's (MSU) Center for Advanced Vehicular Systems (CAVS).

In 2001, as part of Mississippi's successful recruitment of the Nissan Motor Company manufacturing plant near Canton, an automotive research program began at MSU. CAVS was established in late 2003 to focus on engineering, research, development and technology transfer for the automotive industry. CAVS often collaborates with Nissan to make sure the quality of Nissan's products meet customers' expectations, thereby increasing the job security of the Mississippians employed at the Canton factory.

In 2009, Nissan presented the following problem to a group of MSU undergraduate students as part of their senior project in the electrical and computer engineering program:

Once a car is assembled, Nissan employs a trained test driver to assess the quality of every part. One requirement is that when a car is driving on a straight stretch of road, the steering wheel is also straight, giving the driver clear vision of the speedometer and other dials on the dashboard. In the past, Nissan had depended on each test driver's perception of whether the steering wheel was straight within one to two degrees. However, this perception varied from driver to driver and was dependent on human subjectivity. Nissan knew that the final authority was the customer. If the customer thought the steering wheel was not straight, they would make a warranty call, thereby lowering the customer's satisfaction, effecting Nissan's reputation and increasing warranty repair costs.

During their year-long project, the students designed a technology that would measure the straightness of the steering wheel within a tenth of a degree while removing human subjectivity from the test.

The Nissan engineers loved it.

"At this point, because we had been working with the students anyway here at CAVS, we took it on with our full-time people and said let's take this from a senior design project to a true product," said CAVS director, Roger King, Ph.D.

"There was a lot to be done to create the finished product before it could be transitioned and turned over to Nissan," added the associate director of CAVS, Mike Mazzola, Ph.D.

In June 2010, the CAVS team sat down with Nissan engineers to discuss what kind of functions the device needed, such as wireless capability and easy installation and removal. The team also had to make sure the technology did not interfere with the airbag or endanger the test driver. The CAVS team of four engineers completed the prototypes and transitioned the "Clear Vision" technology to Nissan at the end of 2010.

"CAVS' full-time professionals were able to advance the technology to the point where Nissan could take it over and begin to use it in their factory and throughout North America," said Mazzola.

Because Nissan initially conceptualized the idea and the equipment was designed by undergraduates and brought to finalization by CAVS with state funding, the "Clear Vision"

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technology is owned exclusively by Nissan.

"We felt like we were doing a public service for Mississippi because those are Mississippians working down there," said Mazzola. "We have a vested interest in making that operation as economical, as cost-effective and of the highest quality possible."

Visit www.cavs.msstate.edu for more information on the Center for Advanced Vehicular Systems.