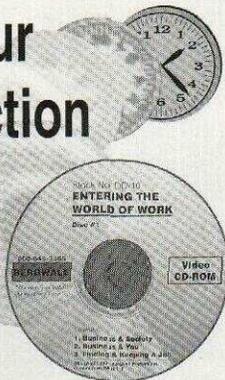




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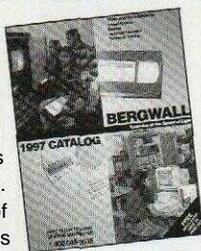
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## Nadine in the Driver's Seat

**D**id you ever wonder how automobile manufacturers determine fuel efficiency, auto emissions, engine and transmission endurance, and overall reliability of a new vehicle? Obviously, test driving the vehicle is the only way to test the performance of some of these integrated systems.

Endurance tests combined with grueling conditions cause automobile manufacturers to put automated driving systems in the driver's seat to control the vehicles during these tests. These conditions include high and low air pressure, hot and cold temperatures, high and low speeds, and driving times beyond human endurance.

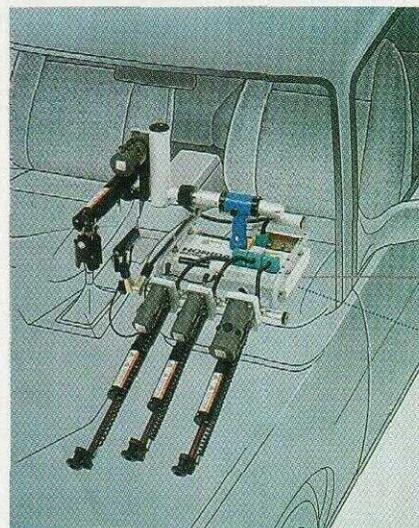
Nadine (see fig.) is a robotic driving machine that is capable of outperforming its human counterparts under torturous driving conditions, as long as the automobile can be tested in a laboratory rather than on a test track. The frame of the automobile is locked down with the wheels positioned on a 48" diameter roll that is the equivalent of an exercise treadmill for automobiles. The Chassis Dynamometer is the vehicle inertia simulator capable of simulating wind, hills, and other road situations. All the conditions for the driving test are now under the control of the laboratory technicians and their computers.

Horiba Ltd. is the company that designed and built the ADS-1100 Automatic Driving System, less formally known as Nadine, which was the name of an MIT co-op student who worked on its development. Horiba's main office is in Kyoto, Japan. This multinational corporation also has facilities in Korea, America, England, Germany, France, Austria, Sweden, and even Czechoslovakia.

To conduct a performance test, Nadine must be assembled in a special basket inside the driver's seat of the vehicle. The basket prevents the robot's body from shifting during the test.

After the actuators are aligned with the controls of the vehicle, Nadine can automatically adjust its manipulators to meet the requirements of the specific vehicle. Technicians can also control the robot using a hand held remote control or a host computer.

In much the same manner as its human counterparts, Nadine goes



through a learning cycle to become familiar with the specific characteristics of a new vehicle. Then Nadine stores the information in its computer so that a test on the same type of car can be initiated very quickly.

A robotic driving machine at this very moment could be test driving a car that you will own in the future. When vision technology is ready for the open road, a descendent of Nadine might become your family chauffeur.

*Our thanks to Douglas Bracken, automotive sales engineer, Horiba Instruments, Inc., Ann Arbor, MI, for help in gathering information and images for this column.*

### Recalling the Facts

1. Why would a manufacturer choose Nadine as its test driver?
2. How does Nadine know how to control a vehicle during the driving test?
3. How does an ADS-1100 Automatic Driving System test differ from one performed on a test track?
4. How did Nadine get its name? **TD**

Alan J. Pierce is associate professor, Department of Technology, Elizabeth City State University, Elizabeth City, NC 27909.

