Laser device can detect alcohol in cars

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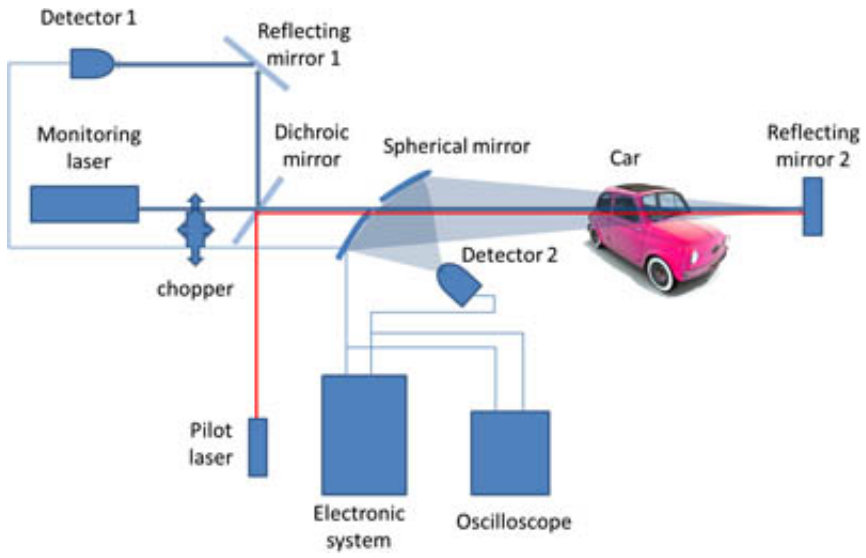

The experiment setup involves two lasers (a monitoring laser and a pilot laser), two detectors, two reflecting mirrors, a chopper, a spherical mirror, a dichroic mirror

A new open-access article in the *Journal of Applied Remote Sensing* is garnering attention for research that could aid in the campaign to prevent drunk driving: a device that can detect alcohol in cars.

The article "Stand-off detection of alcohol in car cabins," by Jarosław Młyńczak, Jan Kubicki, and Krzysztof Kopczyński of the Military University of Technology in Warsaw, details experiments using an external laser device to detect the presence of alcohol vapors inside of a moving car. The device was constructed at the university's Institute of

Optoelectronics based on previous research from a 2013 paper by the same authors.

Stand-off detection is a chemical and biological compound identification method using a laser that takes place at a distance from people to reduce the potential for damage. The authors note that the use of stand-off detection for chemical identification is already described in many papers, but that developments in the types of lasers that can be used in this application have been made in recent years, including "eye-safe" microchip lasers.

"This work illustrates how remote sensing technologies affect our everyday life," said Marco Gianinetto of the Politecnico di Milano, an associate editor with the journal. "We all are already familiar with laser instruments used by the police for speed-limit enforcement. Now these researchers have demonstrated how a laser device could be effectively used for detecting drunken drivers and thereby helping to reduce the number of accidents caused by drivers under the influence of alcohol. In the future, a similar technology may be developed to detect different chemical compounds, enabling the detection of drivers under the influence of other intoxicants."

The use of the device is simple: The laser system is set up on the side of the road to monitor each car that passes by. If alcohol vapors are detected in the car, a message with a photo of the car including its number plate is sent to a police officer waiting down the road. Then, the police officer stops the car and checks for signs of alcohol using conventional tests.

The authors note that the device would likely also identify cars where the driver is sober but the passengers are not, or if there is spilled alcohol in the car, but that the device "will surely decrease the number of cars that have to be checked by police and, at the same time, will increase

efficacy of stopping drunken drivers."

The device was tested with a car deployed on the road while the laser stayed in the laboratory next to an open window, making it possible to extensively monitor the device.

The researchers simulated alcohol vapor coming from a human lung by evaporating a water solution of alcohol of an appropriate concentration and at an appropriate temperature. The results showed that the presence of alcohol vapors was detected at concentrations of 0.1% and greater.

"From the practical point of view, there seem to be some countermeasures, such as driving with windows open, solar screens on the side windows, etc., that can be applied by drivers to deceive the system," the authors wrote in their conclusion. "However, such situations are very easily detected by the system, which sends this information to the policeman indicating that the car should be checked."

Other issues, including driving with air-conditioning or fans, will be investigated in the next stages of the ongoing project, as well as addressing commercialization concerns including creating a device that is more compact, robust and user-friendly.

More information: Paper: remotesensing.spiedigitallibra … rticleid=1874322#r17

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