Virtual display for cars could reduce accidents

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Many accidents, especially at night, are caused by motorists having to take their eye off the road as they look down to see the car instruments. Head-up displays would be a solution, were they not so expensive and bulky. OEDIBUS has an innovative solution.

Driving at night is dangerous. Research shows that, although less than one third of all driving is done at night, over 50 per cent of the fatalities occur during this period. For pedestrians, 60 per cent of fatalities occur during the hours of darkness. Part of the reason is that drivers have to change the focus of their eyes and the direction of their gaze every time they look down at the instrument panel.

A head-up display (HUD) can improve the situation, by projecting a virtual image of the instruments along a direction closer to the driver's gaze when looking ahead and at a focal point far away from the driver.

"Conventional HUDs project the image onto the car windscreen," says Piermario Repetto of Centro Richerce Fiat and OEDIBUS coordinator. "The problem with conventional displays is that they are expensive and occupy an unacceptably large volume, typically in a range from 3 to 5 litres, which is impractical for most car instrument clusters."

Part of the problem with the volume is that the windscreen projection system needs an optical chain, the size of which is difficult to reduce. "The OEDIBUS display chain is very small, and the whole system occupies less than 0.5 litres," adds Repetto. "We use holographic

technology to couple the light into and out of the HUD combiner. Light propagates through the material of the combiner and a set of holographic diffraction gratings is used to relay the image from a state-of-the-art microdisplay to the driver's eye."

"This HUD concept is a real breakthrough," Repetto says. "It's a completely new way of making HUDs. It's very comfortable for drivers, too; there are only limited restrictions on their viewing position. And because it produces a virtual image, drivers don't have to change their focus when they look at the display panel mounted on top of the instrument cluster."

The HUD will be exhibited at the forthcoming IST 2004 conference, and plans are in place for putting the system into production. "Expect to have HUDs installed in cars from 2008 onwards," says Repetto.

Source: IST Results
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