

# Light beams offer bright future for lighter-weight cars

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(Phys.org)—Beams of light could one day replace the jumble of wires under a car bonnet, leading to lighter-weight and more fuel-efficient vehicles.

And passengers in the back seat could also tap into rays of visible or [infrared light](#) to watch films or listen to music transmitted through their overhead lighting.

University of Warwick scientists are pioneering research into optical wireless – where data signals travel through light – and its use in cars.

Their research was presented at the recent International Conference on Transparent [Optical Networks](#) held at the University.

Optical wireless can use just a basic LED, such as those used in torches, to send data. In situations where it's best for the beam to be invisible, infrared light can be used instead.

While optical wireless has been explored for use in aviation for some time, scientists in the University of Warwick's Department of Engineering are

leading the way globally in terms of its use in private vehicles.

Inside a car, it can be used to communicate between parts inside the [engine compartment](#), such as between [temperature sensors](#) and the engine management system, or between the brakes and the vehicle speed control systems.

In addition it can be installed into the overhead lights above the passenger seats to send multimedia content for in-car entertainment.

The major advantage of optical wireless is the weight of wiring it can cut out of cars, which translates into significant fuel savings over the lifetime of a vehicle.

But it also reduces manufacturing costs, as LED and infrared light sources are not expensive to make, and cuts back on the expense of maintaining and repairing wires.

Also, unlike radio frequency communications, which suffer from a congested bandwidth, optical wireless benefits from an unlimited and unregulated spectrum.

Combined, all these factors spell significant advantages over the current systems for in-car data which, in the engine, are generally copper wire-based or carbon fibre systems.

Radio frequency signals are used for smartphones, for hands-free headsets for the driver and passengers and for multimedia related applications such as tablet PCs.

Professor Roger Green said: "Optical wireless is relatively unknown at the moment.

"But it's not hard to imagine a day when passengers can watch TV streamed through a beam coming from their overhead light, or when

parts of the engine can 'talk' to each other without wires.

"We believe that this technology is poised to come into its own - not least because of the potential [fuel savings](#) to be gained from taking weight out of a car.

"Removing that weight could translate into lower fuel costs over the life of a vehicle.

"It is also cheap to install as it can use a simple LED light source which are being mass produced at the moment.

"And it has other benefits such as its lack of electromagnetic interference and the fact that, unlike the overcrowded radio spectrum which we use for much of our data communications, optical wireless is unlimited by the technical and regulatory bandwidth limitations which exist for radio signals."

Provided by University of Warwick

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