

OMEGA at the top of the data transfer game

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Researchers in Europe have successfully developed a new transfer technology for video data. An outcome of the OMEGA project, the team transferred data at an extremely fast rate of 100 megabits per second (Mbit/s) without any losses. OMEGA ('Home gigabit access') was funded under the 'Information and communication technologies' (ICT) Theme of the EU's Seventh Framework Programme (FP7) to the tune of EUR 12.41 million. This latest technology could be brought to market a lot sooner than expected.

Visible light communication (VLC) enables the conversion of regular light-emitting diodes (LEDs) into an optical wireless [local area network](#) (WLAN) with just a few extra components. So not only do the lights do what they're supposed to do (i.e. provide light), but they can also transfer

information. Thanks to this technology, users, for instance, can send and receive images in high-definition (HD) quality to personal computers, laptops and even mobile phones without any trouble. A case in point is people watching a film on a laptop via the Internet. With respect to optical WLAN, light from the LEDs in the overhead lights acts as the transfer medium.

But OMEGA pushed the envelope in transferring data at a rate of 100 Mbit/s by using LEDs in the ceiling that light up more than 10 square metres. Researchers from the Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute (HHI) in Germany, one of the OMEGA partners, say the receiver can be placed anywhere within this radius, which is the current maximum range.

"This means that we transferred four videos in HD quality to four different laptops at the same time," explains HHI's Dr. Anagnostis Paraskevopoulos. "The fundamentals of visible light communication were developed together with the industry partners Siemens and France Telecom Orange Labs.

At HHI, the team of project manager Klaus-Dieter Langer is now working on expanding the [novel technology](#).

"For VLC the sources of light - in this case, white-light LEDs - provide lighting for the room at the same time they transfer information," Dr. Langer says. "With the aid of a special component, the modulator, we turn the LEDs off and on in very rapid succession and transfer the information as ones and zeros. The modulation of the light is imperceptible to the human eye. A simple photo diode on the laptop acts as a receiver. The diode catches the light, electronics decode the information and translate it into electrical impulses, meaning the language of the computer."

A positive factor is that only a few components are needed to prepare the LEDs so that they function as transfer media, according to the researchers. The downside is that the transfer is impaired once something comes between the light and the photo diode (e.g. when a user holds their hand over the diode). The group suggests that laptops, Palm devices or mobile telephones are all potential end devices.

Despite the innovation of the technology, the researchers do not think that VLC will replace regular WLAN, or even PowerLan or universal mobile telecommunications system (UMTS). Its use is most applicable for data transfer where radio transmission networks are not wanted or even possible, the researchers point out. The potential to make combinations exists, they add, saying that optical WLAN can be used in one direction while PowerLan can be used for the return channel.

Sites that can benefit from this new transmission technology include hospitals where the use of radio transmissions is not permitted, as well as production plants where radio transmissions can make processes work improperly sometimes.

Scientists from Germany, Greece, France, Italy, Austria, Slovenia and the United Kingdom were part of the OMEGA consortium.

More information: OMEGA: www.ict-omega.eu/

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