

Researchers combine mobile phone technology and microscopy

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VTT Technical Research Centre of Finland has developed an optical accessory that turns an ordinary camera phone into a high-resolution microscope. The device is accurate to one hundredth of a millimetre. Among those who will benefit from the device are the printing industry, consumers, the security business, and even health care professionals. A new Finnish enterprise called KeepLoop Oy and VTT are already exploring the commercial potential of the invention. The first industrial applications and consumer models will be released in early 2012.

The operation of the device is based on images produced by the combined effect of an LED light and an [optical lens](#). Various surfaces and structures can be examined in microscopic detail and the phone's camera used to take sharp, high-resolution images that can be forwarded as MMS messages.

An ordinary mobile phone turns into an instant [microscope](#) by attaching a thin, magnetic microscope module in front of the camera's normal lens. The device fits easily in the user's pocket, unlike conventional tubular microscopes.

The plastic macro lens of the mobile phone microscope magnifies objects effectively. The camera's field of view is 2 x 3 millimetres. A number of LEDs have been sunk into the outer edge of the lens, allowing objects to be illuminated from different angles. Images illuminated from several different angles could be used to produce 3D [topographic maps](#), for example, with [mobile phone software](#). The [3D maps](#) would be

accurate to one hundredth of a millimetre.

The competitive edge of the product is based on next-generation lens technology, the compact and user-friendly structure, and customisable extra features.

The mobile phone microscope is suited for examining surfaces and surroundings, for security, health care, and even games

The mobile phone microscope could also be used to study surface formations, especially in the printing industry as part of quality control and in field conditions. In the security business the device could be used, for example, to read microcode in various logistics systems, while it is also suited for studying security markings, and for authenticating products as genuine as part of brand protection. The microscope is capable of detecting hidden symbols in products that are not visible to the naked eye.

The device can also be applied to study of the environment. Consumers could use the instant microscope when out and about to examine the leaves of trees and plants, for example, or study insects. Another potential application is in examining textile structures such as strands of hair, or the fibrous structure of paper.

The device also has uses in social media, and in community-based hybrid media where traditional forms of media are used in combination with each other. There are also several potential applications in the gaming world.

Provided by VTT Technical Research Centre of Finland

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