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New Imaging Device That Is Transparent

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Wed Feb 20, 2013 4:50pm EST

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Fluorescent light traveling through polymer devices that respond to gestures alone
WASHINGTON--(Business Wire)--
Digital cameras, medical scanners, and other considerably during the past decade. Contin Austrian research team has developed an ent based on a flat, flexible, transparent, and sheet. The team describes their new device paper published today in the Optical Societ Express.

<http://mms.businesswire.com/bwapps/mediaser>
The world's first flexible and completely t film is coated with fluorescent particles.

The new imager, which resembles a flexible particles to capture incoming light and cha sensors framing the sheet. With no electron imager`s elegant design makes it ideal for including user interface devices that can r a simple gesture.

"To our knowledge, we are the first to pres transparent - no integrated microstructures and scalable at the same time," says Oliver University Linz in Austria, co-author of th

The sensor is based on a polymer film known which is suffused with tiny fluorescent par wavelength (blue light for example) and the (green light for example). Some of the reem out of the imager, but a portion of it trav film to the outer edges, where arrays of op cameras) capture the light. A computer then gray-scale image. "With fluorescence, a por actually stays inside the film," says Bimbe our sensor."





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For the luminescent concentrator to work as had to determine precisely where light was the film. This was the major technical challenge cannot be divided into individual pixels like a smartphone. Instead, fluorescent light from the film travels to all the edge sensors. Calculating where the light enters the imager would be like determining where along the train reached its final destination once.

The solution came from the phenomenon of light traveling through the polymer. The longer it takes to measure the relative brightness of light entering the imager, the longer it takes to calculate where the light entered. This technology has already been employed in an input device that uses a laser point on a screen.

The researchers were able to scale up this technology. Light arrives from every direction at each film's edge. They could then reconstruct the image to X-ray computed tomography, more commonly known as CT.

"In CT technology, it's impossible to reconstruct a measurement of X-ray attenuation along one direction. With a multiple of these measurements in different directions, however, this becomes possible. In our technique, we use X-rays, our technique uses X-rays.

Currently, the resolution from this image is about 100 micrometers (the first prototypes). The main reason for this is the low-cost photodiodes being used. The researchers are developing prototypes that cool the photodiodes to achieve higher resolution.

By applying advanced sampling techniques, they can improve the resolution by reconstructing multiple images from different positions (the final image, not the polymer itself). By having different images reconstructed, it's possible to make the sensor significantly slower. The final resolution is, up to a certain limit.

The main application the researchers envision is touch-free, transparent user interfaces for television or other display technology. This is similar to the full gesture control used in video-game players with external motion-tracking devices. The polymer objects to provide them with sensor capabilities. If transparent, it's also possible to use multiple different wavelengths to capture color images.

The researchers also are considering attaching a regular, high-resolution CCD sensor. This would be done at the same time at two different exposures. "We want a high-resolution image with less overexposed areas and a high dynamic range or contrast are critical," notes that the polymer sheet portion of the sensor is therefore disposable. "I think there are many things we are not yet aware of," he concludes.

Paper: "Towards a transparent, flexible, so-called 'smart' using thin-film luminescent concentrators," *Optics Express*, Vol. 21, Issue 4, pp. 4796-4810 (2013)

EDITOR'S NOTE: Images are available to members. Contact Angela Stark, astark@osa.org.

About Optics Express

Optics Express reports on new developments in photonics and optical engineering.



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