Researchers develop tiny projector (w/ Video)

September 13 2010

The pocket projector

The projector of the future, 1 cm^3 of technology that can be integrated into a portable computer or mobile telephone, is about to take the market by storm.

Lemoptix, a spin-off of EPFL, working together with the Maher Kayal Laboratory, completed its development at the beginning of September. It should be on the market by the end of 2011. Many applications have already been identified, in particular in the automobile industry or the operating theater.

With a projection head of 1 cm^3, and a total size smaller than a credit card, this new micro projector is a real breakthrough. It can be integrated in a portable computer or mobile telephone , or even an MP3 reader, while keeping its bright, high-quality image. This new device will enable the projection of documents and videos onto a wall, in the same

way as current fixed projectors. The size of the image can be adjusted simply by modifying the distance between the projector and the projection surface; the resulting image remains uniformly clear.

Another significant advantage: this projector uses very little energy, requiring on average 30% less current than the matrix- or LED-based technology currently available on the market. This solution, now being finalized, should be available in 2011 for industrial applications, and the following year for consumer electronics, according to Nicolas Abelé, Technical Director of the start-up, located in the EPFL Science Park.

Micro electro-mechanical systems (MEMS) are only beginning to be used as a basis for the next generation of optical material. "This micro-projector functions using tiny mirrors of less than a millimeter's thickness. Positioned on a silicon (wafer) disc, they reflect red, blue and green laser beams," explains Maher Kayal, the EPFL research director who developed the microelectronic aspects of the system. The device, contained in a tiny glass case (3 mm x 4 mm), oscillates so rapidly that the beam can scan a surface up to 20,000 times a second. In August, Maher Kayal's team was able to generate a color image in VGA resolution (640 x 480px) for the first time.

This pocket [projector](#) works at a minimum distance of 50 centimeters, and enables the projection of images onto a surface equivalent to a 15-inch screen. During the last few months, the Lemoptix team has considerably improved the architecture of the optical head containing the laser light sources and the MEMS mirrors, thereby reducing the size of the whole device and its energy consumption. The manufacturing and assembly processes have also been defined, and the first sub-contractors identified. The company succeeded in raising 1.4 million Swiss francs of new funds at the end of August.

This technology has many advantages that will enable it to succeed in the

market. "The micro-components used can be manufactured in thousands, even tens of thousands, at low cost," emphasizes Nicolas Abelé. It will be developed from now until end-2011 for industrial applications. For example, it could be used by automobile manufacturers to project information directly onto the windshield, such as speed, GPS information etc. Medical technology companies have already shown an interest: this technology could be used to beam information related to an operation directly onto the patient, and would avoid the surgeon having to lift his head to look at a screen. The improved brightness and contrast will enable it to replace LCD screens. The Lemoptix team is already envisioning the creation of an interactive version; this would allow you to touch the projected image to zoom or change screen.

Provided by Ecole Polytechnique Federale de Lausanne