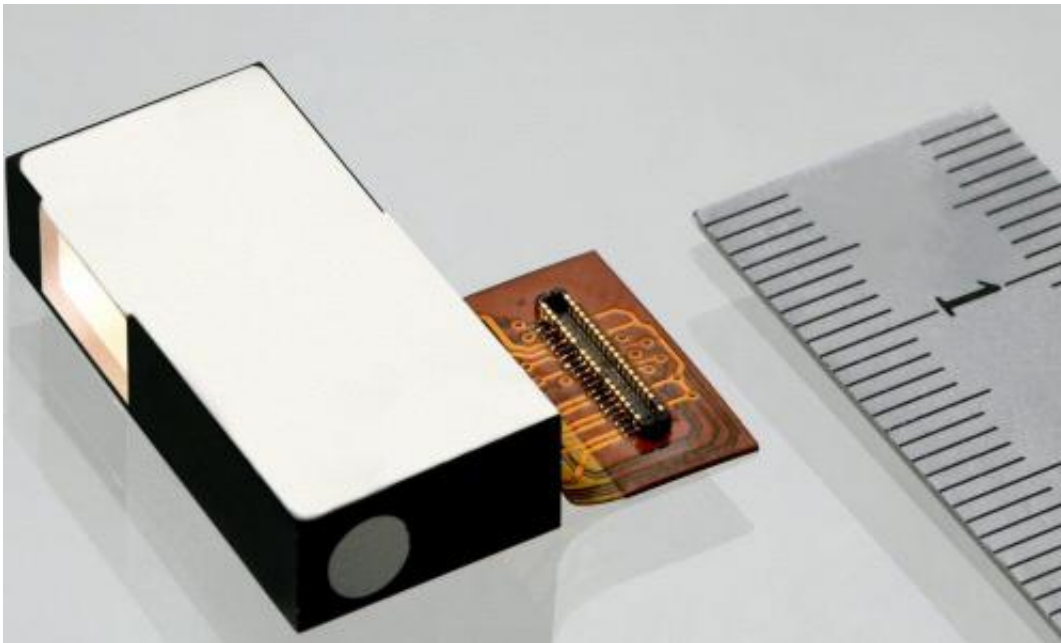


Projection system barely larger than a grain of sugar

May 14 2014, by Cécilia Carron



Credit: Lemoptix

Lemoptix is developing an ultra-compact projector. The EPFL spin-off has already successfully entered a very competitive market, and will target new markets in 2014.

A projection system barely larger than a grain of sugar is going to be integrated into many tools of daily life. From [augmented reality](#) glasses to mobile phones, from the "head-up display" system for cars to 3D scanners – Lemoptix, which now has 22 employees, hopes to finalize

major contracts by the end of the year. An update follows with the designer and CTO of the company, Nicolas Abelé.

Your company was founded in 2008. At what stage is the development of your tiny projector?

Nicolas Abelé: In 2008, when we had just developed this [technology](#) between the laboratories of microsystems and electronics, the goal was primarily to build a projector into mobile phones. On the one hand, that is one of the most difficult challenges, since it requires from the getgo that the device is small, that its energy use is minimal, and that the cost is extremely reasonable. On the other hand, the market is uneven in this field because the stakeholders focus in successive phases, either on the software (operating system) or on the hardware. In the meantime, three other important markets have emerged for our technology. Currently the most attractive of those is the Head-Up Display for cars. Manufacturers themselves came to us to develop the "next generation," with the ultimate goal of creating an augmented reality system for the driver.

The second market is the three-dimensional scanner for laptops, gaming and security. In terms of data, it is the equivalent of what provides the "Kinect," but our technology brings the dynamic aspect of scene illumination, which allows the image capture system to be much simpler, more compact and with low [power consumption](#). An interesting application is for 3D printers, because it enables a dimensional image of the object and can be instantly transmitted to the printer without any interruption or loss. More recently, we have confirmed the tremendous advantage of our projection system for [augmented reality glasses](#). For now, the projection surface is small and faint because it requires special treatment of the glass to make it opaque. Our solution makes it possible to project a larger image (immersive) without an opaque surface and with ultra-[low power consumption](#), thereby permitting a longer and more

convenient use.

These technologies seem promising, but when will we see them on the market? In an article published in 2010, you announced a market launch in 2011. So what is the plan?

The heart of the technology was actually built by the Japanese manufacturer Hamamatsu Photonics in 2011 and placed on the market there a year and a half ago, for a variety of systems ranging from laser printing to industrial sensors. We are operating under a system of licensing and negotiations that takes a long time. In all the areas described above, we have been in contact with very large companies for many years. We must go through many contacts within these large companies. We must connect the ideas to the engineer responsible for the integration itself. And each time, we must adapt our concept based on customer needs. But now we have reached very advanced stages in discussions with major players in all the fields of application mentioned above. With the car, for example, the goal is to have our technology integrated into the 2017 models.

What about your technology is innovative? Where will you make your devices, and how will you sell them?

The technology is based on MEMS (micro-electro-mechanical systems) and operates via a single tiny mirror less than a millimeter in diameter that is made of several hundred copies on a silicon wafer. A projector contains a single mirror which reflects red, blue and green laser rays. The mirror oscillates on two axes of rotation, and the light beam scans at a rate of 20,000 times per second. Each pixel of the image is created by modulating the laser at around 100 million pulses per second, fast

enough for the human eye, so that the image is completely homogeneous and stable. All the mirror prototypes are manufactured on campus in clean rooms (CMI), the electronics are designed in our local Innovation Park at EPFL and assembled locally at PCB, the integrated circuits (ASIC) are made in Taiwan, and assembly of the projection head is carried out by us. We have people in Korea, Japan and the United States, in particular, to track and canvass customers.

What is the secret of your quick development?

Our greatest strength is definitely that we have among our 22 employees excellent specialists in all applicable areas such as optics, microtechnology, electronics, opto-mechanics – the list goes on. We are also effective in the design stage because we can ensure that all these trades, with their highly specific vocabularies, perspectives and expertise, work well together to achieve a common goal. Having all of this expertise internally, as opposed to externally, means that we can quickly find compromises between all the technical specifications, which makes it possible for us to advance quickly. The huge advantage is that we constantly find new ideas for improvement, which leads to innovation and strengthening our patent portfolio. The disadvantage is that, at the "T" moment, we are never fully satisfied with the state of the technical progress, since we always know how the system could be improved. This year we decided to achieve a kind of launch for a first marketable version with reference designs in different city markets. This makes 5 years that we have been optimizing our system, and the time is ripe for discussing its integration into the production lines (supply chain) of major market players. Due to our constant innovation, our rapid execution and its high performance, our technology is often chosen to be included in the advanced phases of development, despite competing heavyweights with large teams who have been working for 15–20 years on the development of very similar technology. We are convinced that 2014 will be the year of Lemoptix!

How much investment have you needed so far? Do you feel pressure from your investors, most of whom are business angels?

We are pretty proud of having managed to get a product that has a big advantage over the competition with an investment of only 5.5 million Swiss francs. Keep in mind that our main competitors had investments from the tens of millions up to, for one of them, half a billion. For a company like ours that is growing rapidly, the pressure is high but manageable, and investors appreciate both our technical and commercial progress.

Provided by Ecole Polytechnique Federale de Lausanne

Citation: Projection system barely larger than a grain of sugar (2014, May 14) retrieved 25 April 2024 from <https://phys.org/news/2014-05-larger-grain-sugar.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.