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## Measuring blood flow

The Valais-based company, Aïmago, develops cameras that visualize dermal blood flow. This provides patients with new hope for better diagnoses and more effective therapy management.

Image showing entire device "The EasyLDI device is now being used in several European countries." (Source: Aïmago)

Image showing screen "Information on dermal bloodflow at a glance"(Source: Aïmago)



"There is hardly anything more painful than large-area skin burns," says Theo Lasser, who is a professor at the Federal Institute of Technology Lausanne (EPFL) and co-founder of the new company Aïmago. And as if the intensity of the pain wasn't enough, burn victims also suffer from the tedious medical treatment. After an accident, it can take several days before a clear diagnosis is reached in terms of the degree of the burn.

One of the problems is measuring dermal blood flow. Tissue that is cut off from the blood flow will die. The success of treatment for a serious skin injury depends on the blood supply to skin tissue.

Until the turn of the millennium, doctors could do no more than wait until a wound was stabilised, and only then were

they able to determine the level of dermal blood flow by palpating the affected area. Some time later, the first contactless optical scanners made their appearance. They utilised what was known as the Doppler effect, which, among other things, means that the frequency of light changes depending on how near or far away the observer is.

Optical blood flow scanners emit a laser beam up to two millimetres deep into the skin. The beam of light is scattered by the red blood cells. The reflected light is detected and it is then possible to determine, based on the Doppler effect, if and how the blood cells are moving.

The first generation of these scanners were not appropriate for clinical care because the scanning process alone lasted about five minutes. During this time, the patient's breathing and heart rate would invariably distort measurement results.

"To obtain a useful image of the cutaneous blood flow, we needed quicker imaging," explains Theo Lasser. In his Laboratoire d'Optique Biomedicale, he therefore conducted the first tests with a full-screen camera that can photograph and analyse an area of skin at a rate of 20,000 photos per second. The goal was ambitious, but the link between basic optoelectronic knowledge and medical application is a specialty of Lasser's laboratory. The first relevant patent was filed in 2005.

The response among medical experts was euphoric, because the camera's area of application reaches far beyond burn injuries: the first clinical results already indicated that the new camera provided more objective diagnoses and therefore more effective treatment for plastic surgery, healing wounds, diabetes, rheumatology and neurosurgery.

Theo Lasser had the opportunity to commercialise his product by licensing it to a medtech company. However, Lasser's extensive experience as an R&D Manager with the German optics company Carl Zeiss had served him in good stead; he had other plans: "I wanted to establish a company with long-term growth potential."

In the summer of 2008, he partnered with the young micro-technician Michael Friedrich to establish the company Aïmago. Acting as the implementation partner for the EPFL, the start-up company launched its first CTI-sponsored R&D project as early as the spring of 2009. The aim of the project was to make the blood flow scanner easier to handle in the operating theatre or in hospital wards. The company's first product was born: the "EasyLDI" – LDI stands for Laser Doppler Imaging. The university hospitals in Lausanne and Zurich conducted clinical trials.

At the same time, Aïmago conducted a first round of financing: in January 2010, banks and strategic investors contributed CHF 1 million in venture capital funding. A year later, the young company – which in the meantime had been awarded the CTI start-up label - launched a second venture capital funding round.

Aïmago now employs twelve people. Management tasks are clearly assigned. Theo Lasser remains behind the scenes as an active board member, while 30-year-old Friedrich manages company's day-to-day operations as Board Chairman and CEO.

In March 2011, the first EasyLDI devices were delivered to customers. Since then, further sales have been concluded throughout Europe all of which are conducted on a leasing basis, so that hospital investments can be set off as operating costs. The income generated by the sales will be used to develop the next series. Theo Lasser is convinced: "We have a unique product and an ideal timeframe."

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