Designing medical devices for developing countries


Klaus Schönenberger in a Cameroun hospital

10.05.11 -

EssentialMed, a start-up based at EPFL's science park, has as its mission the development of medical devices specially designed for poorer countries. To succeed in this, it leverages the know-how of three EPFL laboratories and also the Paul Scherrer Institute.

According to the World Health Organization (WHO), more than 70% of medical devices acquired by developing countries, or donated, will never actually be used! This is due to, for example, insufficient knowledge or expertise to install the device, missing electrical cables, or the absence of qualified personnel. And the remaining 30% often can no longer be used when it becomes necessary to order accessories or spare parts. The vast majority of the inhabitants of these countries has no access to such essential equipment as X-ray machines, incubators for newborn babies or equipment for anesthetics. EssentialMed, a start-up established in September 2010 at the Science Park at Ecublens, is working to improve this situation.

This is indeed a vast project since, to be effective, the device must be adapted to the context in which it is to be used. "This means we have to completely re-think each device, integrating in its design effective solutions to the recurring problems in these countries. These can include: an electricity network that is often defective, resulting in excessive voltages that damage the device; a lack of financial resources for the purchase of the device and the accessories necessary for its functioning; complexity of utilization for poorly trained personnel; or theft", emphasizes Klaus Schönenberger, one of the founders, who has spent around ten years in the management team of a multinational company manufacturing medical devices. This is the context to the signing of a cooperation agreement with EPFL.The cooperation unit and the UNESCO chair in technology for development are working in close collaboration with this rather special start-up, which is constituted as a foundation and is a not-for-profit organization. "We must not only support progress, but also access to these inventions", insisted Patrick Aebischer, President of EPFL, at the launch of the start-up in the Science Park.

Three EPFL laboratories involved

The first target is an X-ray machine. "We often speak about infectious diseases when we're thinking about health problems in developing countries, but road accidents are unfortunately among the main causes of death or handicap. In fact, 90% of these accidents take place in the southern hemisphere", explains Klaus Schönenberger. Two-thirds of humanity has no access to medical imaging equipment, although it is obviously essential in such circumstances. The development work has been broken down into different "technological modules": the X-ray source (the tube), the X-ray detector (creation of the image), the electric power unit, the mechanical stand, the image-treatment system, and the user interface. The device will include a solution that will enable it to continue functioning in spite of frequent electricity cuts. It must also be robust and require only a minimum of maintenance, while enabling the creation of images in high temperatures, as well as high levels of humidity and dust.

Three EPFL laboratories are providing their know-how to respond to some of the challenges involved: the Laboratory of Industrial Electronics, the Laboratory of Composite and Polymer Technology, and the Audio Visual Communications Laboratory. The Paul Scherrer Institute in

Villigen is providing know-how in X-ray technology, and is treating the project with high importance. The HEIG-VD school in Yverdon will also be contributing to the project, as will the Institute of Tropical Medicine and Public Health in Basel. “The objective is to create a prototype that can be operational three years from now. However, the foundation is still looking for financial partners – foundations, sponsors or philanthropists – who are equally motivated by the challenges of this project.” The goal is to ensure that the device is adapted to developing countries, but also to reduce its price and that of its accessories by a factor of ten. The installation of the equipment in the target countries will include the device itself, plus a follow-up on site, training of the users from the commissioning of the device until the end of its life. It’s already envisioned to extend this modus operandi to other types of device; for example, to include incubators, essential to the survival of newborn babies.

Source:*Médiacom*