Elinvision Steps Up Its 3D Orthopedic Foot Scanners with Xilinx's Zynq UltraScale+ MPSoC

Xilinx Technology Enables Rapid Data Processing and Cuts Power Consumption

AT A GLANCE:

Elinvision makes 3D scanners for medical applications, including podiatry and orthopedics. It also makes technology for computer vision quality inspection systems for fertilizer, candy, tobacco, and PET bottle manufacturing companies.

Industry: Industrial
Headquarters: Kaunas District, Lithuania
Established: 2005
Website: www.elinvision.com

Figure 1. Elinvision iQube S+ portable 3D foot scanner

OVERVIEW:

Elinvision's 3D foot scanners are used in more than 40 countries around the world, mostly in podiatry, orthopedic clinics, research centers, sports labs, and custom shoe manufacturing shops. The products are known for their durability, accuracy, and reliability, and do not need repeated recalibration, as many other portable measuring tools often do.

The tools were originally CPU-based, but ultimately the company shifted to a Xilinx FPGA architecture and was able to realize higher scanning quality, while cutting scanner dimensions and costs. Elinvision later introduced its portable wireless 3D foot scanners when it migrated to Xilinx's adaptive SoCs.

CHALLENGE:

Since 2000, Elinvision has been working on visual data processing solutions for its 3D foot scanners using the most-recent scientific discoveries and close cooperation with universities. When the company shifted its core architecture from CPUs to Xilinx FPGAs in 2012, it was quickly able to reduce product dimensions and costs. Additionally, the scanning quality increased significantly, as the company was able to connect and process data from more cameras simultaneously.

More recently, the company was looking to develop a new generation of 3D foot scanners that was fast, reliable, and portable. It wanted a solution that delivered high computing performance and was power-efficient. This led Elinvision to select Xilinx's Zynq® UltraScale+™ MPSoC device over other embedded system processors for its new product design.

SOLUTION:

Elinvision's plantar and full-foot 3D scanners capture accurate measurements of a person's foot to create custom insoles or shoes that fit perfectly the first time. Its newest (and smallest) iQube S+ portable scanner weighs just 12 pounds and takes measurements in just five seconds with accuracy to 1mm, while its larger models capture more-complete foot scans with accuracy to 0.5mm.

"We selected Xilinx's Zynq UltraScale+ for our new designs because of our high computing system requirements and previous experiences with the company," said Mindaugas Šulcas, head of the R&D department at Elinvision.

"The flexibility of the system and long-term support have allowed us to adapt to different customer requirements and the ever-changing image sensor market. By modifying a small part of the FPGA design, we can have different products without changing the printed circuit boards, system architecture, or program code."

Zynq UltraScale+ MPSoC devices provide 64-bit processor scalability while combining real-time control with soft and hard engines for graphics, video, waveform, and packet processing. Built on a common real-time processor and programmable logic equipped platform, the device is offered in distinct variants including dual-application processor (CG) devices and quad-application processor GPU (EG) devices, creating unlimited possibilities for a wide array of applications.

RESULT:

Mindaugas said Xilinx's Zynq MPSoCs have enabled Elinvision to build market-leading products.

Parallel image data processing provided by the Zynq processor has allowed Elinvision to speed up the operation of its scanners, while its FPGA-like adaptability has enabled the company to expand the functionality of its systems.

"Xilinx devices are constantly providing new opportunities for our system," he said. "Low power consumption and fast data processing have allowed us to create a fast, portable, wireless 3D foot scanner that works with mobile applications and stands out among competitors."

Mindaugas added that it has been easy to work with Xilinx as well. "The Xilinx ecosystem is easy to use and understand. They offer high-quality debugging tools, a large selection of example projects, and an active community that make it possible for us to solve all of the problems that we've encountered and get to market quickly. And, after almost a decade of working with Xilinx devices, we think these things are getting better with each year."

ADDITIONAL RESOURCES:

[Learn More about Xilinx's Zynq SoCs](#)

[Learn More About Elinvision](#)