

# Speeding up micro-CT scanning

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Micro-computed tomography or "micro-CT" is X-ray imaging in 3-D, by the same method used in hospital CT (or "CAT") scans, but on a small scale with massively increased resolution. It enables scientists and engineers to see inside structures and reveal hidden secrets.

Micro-CT imaging is opening up a world of opportunities across industries. Now the EUREKA funded project Xamflow has developed an innovative software application that makes micro-CT examinations more efficient and less labour intensive than before.

"Micro-CT scanning started with human biological materials, but nowadays anything can be scanned, synthetic materials, small animals, food, minerals, and fossils for example," says Tor Hildebrand owner of project partner Imacomp AB based in Sweden.

"Companies want to check the internal structure of their products without having to destroy their samples," Hildebrand explains, "with micro-CT scanning, you can check the microstructures in bone, porosity of food, and search for micro anomalies inside materials".

## A time-consuming process

Typically, scanning using [micro-computed tomography](#) is a complicated process that requires the scanning of multiple samples.

"The whole process is complex, time-consuming and involves many manual steps," explains Hildebrand, "there is a lot of switching between

applications and tools, slowing the process down and increasing costs and sources of errors," he adds.

Because of this complexity the project needed to bring together a consortium of partners with a range of different specialisations.

"We needed a company that knew the scanning process, a company that developed the hardware, a company that knew how to analyse the images, a company that could build the whole backend system, and a web developer."

We were able to find a team of five different companies and institutes and bring them together to start this project," says Hildebrand. Lucid Concepts AG based in Switzerland handled the visualization and the [image-processing](#) framework.

The Swedish companies ImaComp AB and Capenta AB in Sweden were responsible for the architecture of the full system and the web application development, respectively.

Two Universities, the KTH Royal Institute of Technology in Stockholm and the University of Applied Sciences HSR in Rapperswil, Switzerland supported with clinical analysis and distributed image processing.

Finally, Scanco Medical AG based in Switzerland developed the imaging hardware. "It was a diverse team of people and specialities this helped us to stay focussed and motivated throughout the project," says Hildebrand.

## **Automating workflows**

At its heart, the Xamflow platform is, in fact, a tool for automating complex workflows. Workflow automation is a growing market as businesses look for ways to streamline their processes to save time and

money.

Once the system has been fully developed and is ready for commercialisation, it can be modified to support different domains and customer needs.

"Once we have the system ready for sale we can provide specialised modules to help organisations to solve their complex examination problems," explains Hildebrand.

Now that the project is finished Xamflow is moving into a beta test phase with first users having access to the system to give feedback and comments.

The international cooperation was invaluable to the success of Xamflow.

"If you want to build a complex workflow solution like this you need a diverse team of companies and expertise. The funding helped us to build a consortium that could handle the diversity of features needed," says Hildebrand.

The partnership has stayed together after Xamflow applying for and winning a second grant that uses advanced image processing and [artificial intelligence](#) to help find and identify structures in 3-D images for both clinical and research applications.

"When you examine and scan humans and animals one of the most important things is to outline the internal organs and abnormalities like tumours, in a process called segmentation." explains Hildebrand, "You need to extract the information from the scan in order to make a diagnosis or plan radiation treatment for example."

## **Taking advantage of artificial intelligence**

Xamflow is particularly suited to help train artificial intelligence networks to identify different tissue and structures inside human and animal bodies.

"To train the artificial intelligence networks, you need to do lots of scans and analyse a wide range of different tissue samples. Xamflow is well suited to support this type of scenario and then offer a user friendly way of using the trained networks for finding structures," says Hildebrand.

There is no doubt that Xamflow wouldn't be on a path to success without the funding.

"The funding allowed us to bring together a team of specialists from Europe to build a complex but still efficient and user friendly system for advanced 3-D examinations in both industry and academia," concludes Hildebrand.

Provided by Eureka Network

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