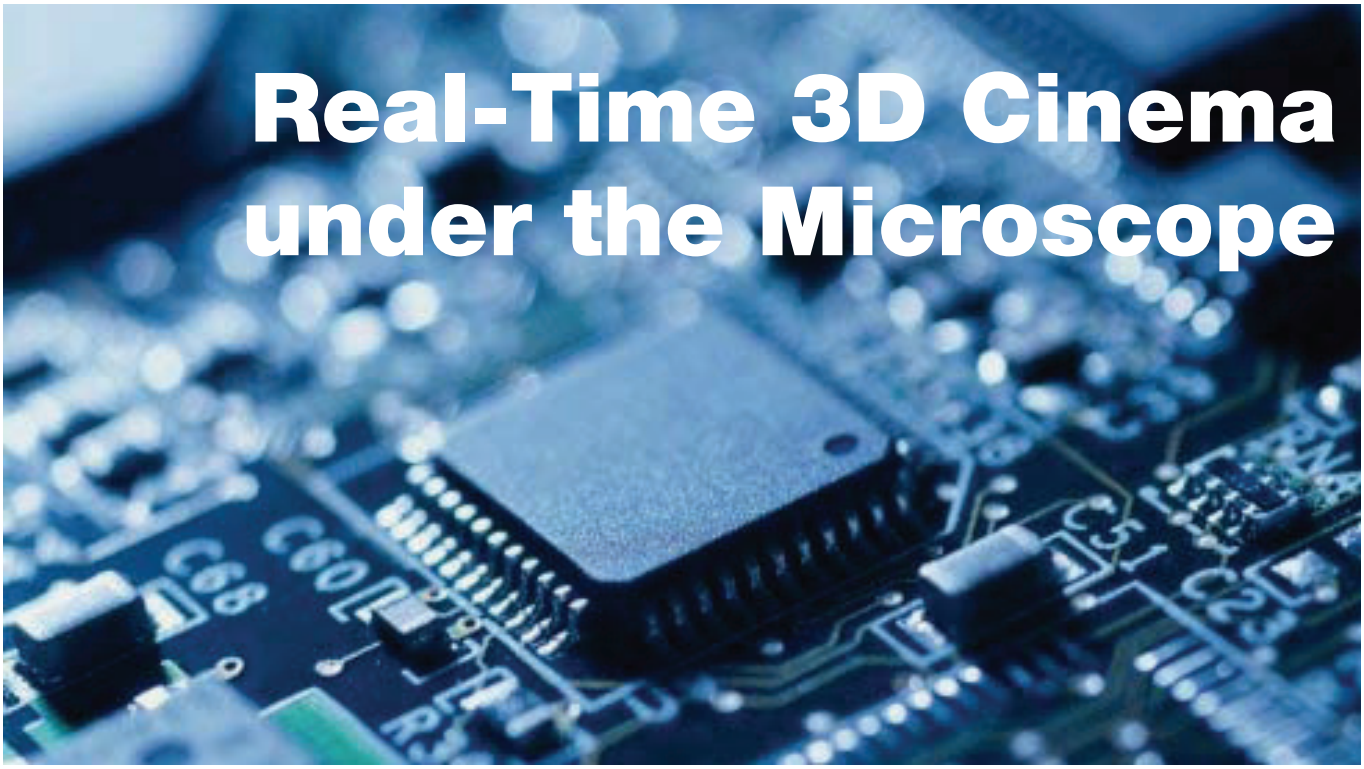
ALLIED Vision Technologies

Real-Time 3D Cinema under the Microscope



TYTEC

TYTEC GmbH is a start-up company based in Jena, Germany. Founded by Mario Türschmann, an experienced engineer in the area of optics and microscopy, it offers developments in the area of micro-imaging. Its Stereo-Wizard (patent pending) makes it possible to digitize microscopic images in stereoscopy.

www.tytec.de

The Challenge: Sharing and Archiving Stereomicroscopic Observations

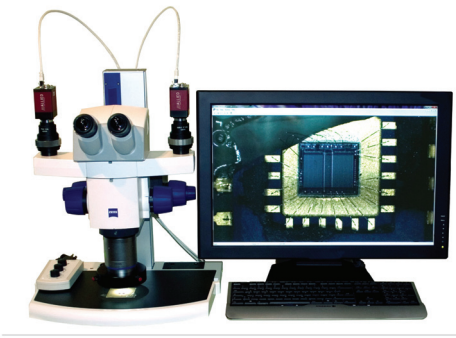
Two eyes are better than one – this simple turn of phrase perfectly describes humans' three-dimensional visual perception. It is, after all, sight generated by both eyes (stereoscopy) which allows us to recognize volume and depth of objects. The same is true of microscopy: if volume, height and depth must be observed, then a stereomicroscope is required. Such is the case in a number of applications, whether in microelectronics, when checking the exact positioning of components, or in biology and medicine, when examining the various properties of model organisms and tissues. The principle underlying the TYTEC-System is a stereomicroscope equipped with two high-resolution digital cameras which then simulate human left and right eyes. Specially developed software converts both signals to convey a stereoscopic image on a 3-D display in real time. A corresponding patent for this new method of image processing is already pending. With the aid of special eyeglasses, several people can view the microscope image three-dimensionally as if they were all looking into the microscope at the same time, allowing discussions and training sessions to transpire in an easier, more natural environment.

Another advantage of this method of camera transmission is the ability to store image data in a stereoscopic format as well. In this manner, important observations can be archived and stereoscopically displayed even years later, as though one were looking again into the microscope's eyepiece at the exact same sample under the exact same conditions. This development represents a decisive advantage in the documentation of different stages within a research project that can be compared to one another — if necessary, with the aid of additional imaging software.

The Solution:
TYTEC StereoWizard With 3D Monitor

The prototype presented at the Vision Show 2009 in Stuttgart consists of a high-performance, primary lens SteREO Discovery.V8 stereomicroscope from Carl Zeiss MicroImaging GmbH. A Prosilica GE1910 from Allied Vision Technologies is mounted on each of the stereomicroscope's two camera adapters. Thanks to their Gigabit Ethernet interfaces, the cameras transfer image data via conventional Cat5 network cables to a desktop computer. There, the Tytec software processes both streams into a single stereoscopic image that can then be displayed on a 3-D monitor.

The result is a brilliant, sharp image providing the viewer with very good three-dimensional perception of the subject. The position of microelectric components on a circuit board, for example, is easily and exactly recognizable on the large monitor.



StereoWizard
TYTEC GmbH

Best Camera, Best Software:
AVT Prosilica GE HD-Cameras with GigE-Vision Interface

In choosing cameras, the vote went to the Prosilica GE1910 from Allied Vision Technologies. "*With a microscopy application like this, the goal is the highest possible image quality on the monitor to get as close as possible to what one sees live under the microscope, staying as true as possible to every detail. Since the heart of the system is the conversion software, the connection between the software and the cameras was just as critical,"* explained Mario Türschmann, founder of Tytec, who developed the system.
The AVT Prosilica GE1910 meets both criteria. At 1920 x 1080 pixels, its resolution meets the highest quality standard at this time for displays (Full HD 1080p) and delivers pin-sharp images. The demonstration at Vision is scheduled to use color cameras, while a monochrome version is also available.

The software connection also proved to be optimal. The GigE Vision Software Development Kit from Allied Vision Technologies meets all the necessary critieria for "rapid prototyping".

"No GigE Vision camera manufacturer on the market offered such a well thought-out and flexible software package," Mario Türschmann exclaimed. "Both the availability for multiple operating systems as well as the unique quality and stability of the interaction between SDK and drivers made the development of the TYTEC software an extremely efficient process.

Use in Practice:
Perfect Complement to High-End Stereomicroscopes

This TYTEC solution is about to be released. It can be sold by microscope manufacturers either as a complete system or can be marketed directly to stereomicroscope users as a separate accessory.

This system offers testing and research labs the ability to view microscope images three-dimensionally in real time on the monitor and to archive the images in the same manner. A further step would be the use of an image processing application that could, for example, automatically analyze or compare the captured 3-D images – such as documenting changes in a biological sample.

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