improvision®

Confocality from structured light

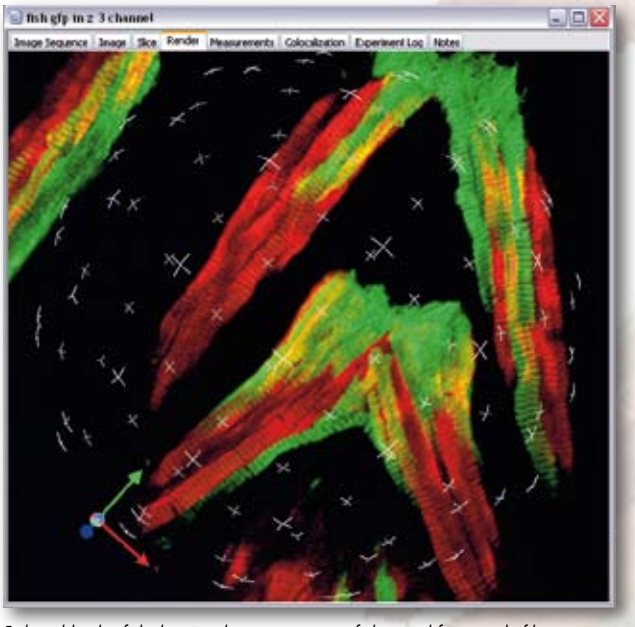
Volocity® Grid Confocal

Your wide field fluorescence microscope is vital to your research. It gives you good images, but you need *great* images to understand your science. You could consider using laser scanning technology to produce confocal quality images, but that can be expensive, difficult to maintain and may not be an appropriate technique for your samples.

Now there is a new way to achieve the results you need – the Volocity Grid Confocal.

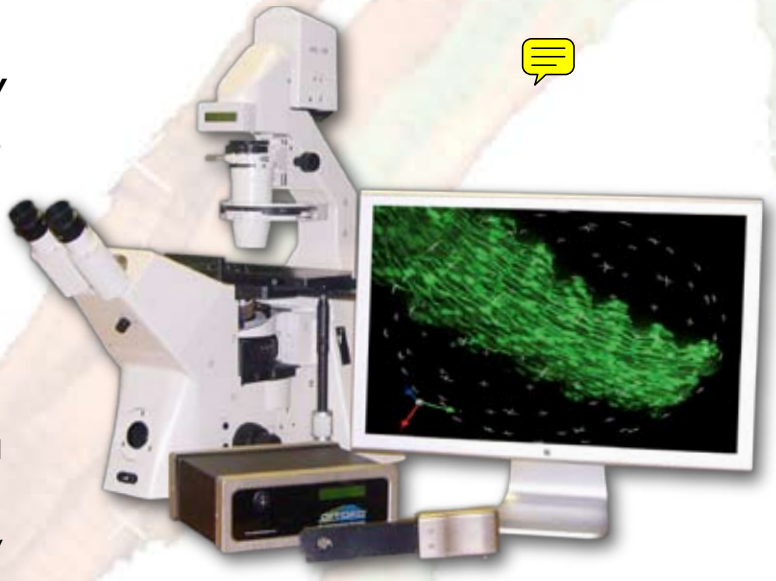
The Volocity Grid Confocal can convert your research microscope into a high speed 3D and 4D acquisition system that provides you with image data of outstanding clarity – in a cost effective way, without using lasers. The technology is compatible with microscopes from all the major suppliers and is supplied for Windows and Mac OS.

Confocal quality images are produced - in near real time - by the addition of the OptiGrid structured light device to your microscope. This proven technique is fast and reliable, and is suitable for use with a wide range of sample types.



5 day old zebrafish showing the arrangement of slow and fast muscle fibres in the jaw region. Courtesy of Dr Henry Roehl, University of Sheffield.

The OptiGrid works by capturing all the image data residing within the depth of field together with all the out-of-focus information coming from the wide field optical system. Using a phase sampling technique, the OptiGrid then eliminates all signals not within the plane of focus. The result is an in-focus confocal image or optical section of a thickness that is the depth of focus of the optical system.



- **Structured light technique provides near real time confocal quality images without using laser scanning technology.**
- **Compatible with a range of hardware including Zeiss, Nikon, Olympus and Leica microscopes, cameras, XY stages, filters, shutters and light sources.**
- **Volocity Acquisition software for easy to use, versatile protocol design for 2D, 3D and 4D imaging experiments.**
- **Volocity Visualization software for fully interactive volume rendering of 3D and 4D data sets.**
- **System functionality can be extended by the addition of further Volocity products for measurements, object tracking, image restoration and many others.**

Volocity Acquisition and Volocity Visualization are part of the Volocity product range. Volocity was first created in 2000 and is now used by scientists around the world for a wide range of cell research applications. See the Improvision web site for a list of selected references and application notes:

www.improvision.com/application_center

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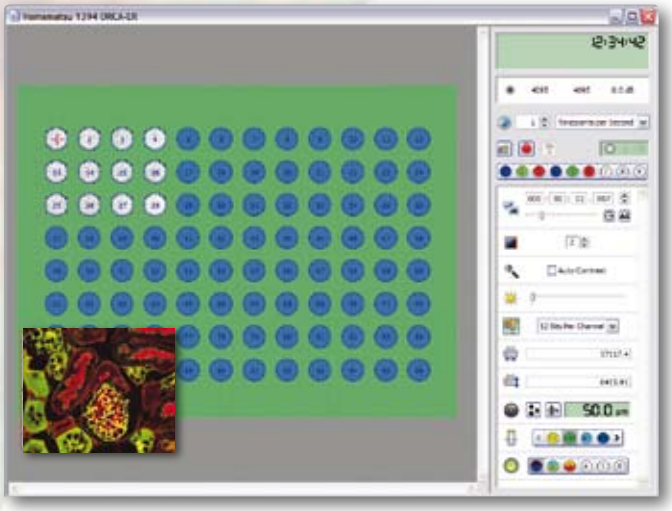
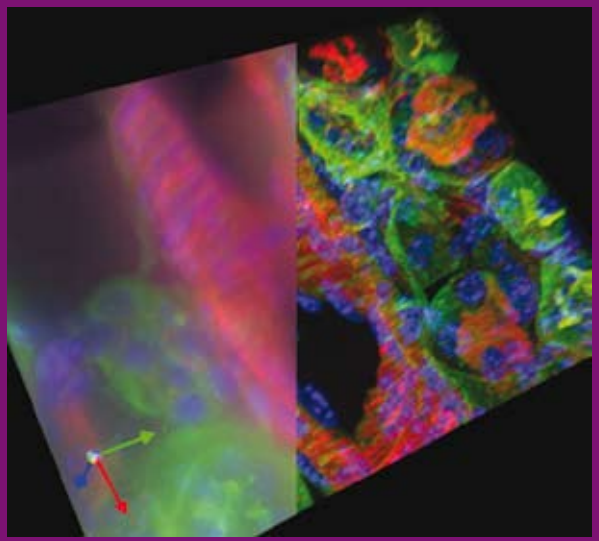


Multi-point acquisition dialog

Image capture in the Volocity Grid Confocal is controlled by Volocity Acquisition software. The award winning design of the user interface makes the acquisition dialog easy to configure – from 2D, single channel capture to complex time resolved, 3D, multichannel experiments. Include a scanning XY stage in your hardware and you can perform multi-point image acquisition on a single slide or multi-well plate, capturing a 2D image, or even a 3D or 4D volume from every point or well.



3 channel wide field and 3 channel Grid Confocal Image

The Volocity Grid Confocal also includes Volocity Visualization, so you can see your 3D data instantly as rendered objects. Channels can be turned off and brightness controlled to achieve the view you need. You can play through time resolved 3D volumes so that you can relate structure to function more easily. By using the Movie Sequencer you can create QuickTime or AVI movies as well as QuickTime Virtual Reality files to share and publish your results.

Image on monitor, overleaf: 20 hour old zebrafish embryo, GFP expression in developing trunk muscle fibres. Courtesy of Dr Murray Hargreave, Centre for Developmental and Biomedical Genetics, University of Sheffield.

If speed is important to your experiments, the Volocity Grid Confocal can meet the challenge. Our advanced high speed parallel processing and video streaming architecture means that you can capture images at the maximum frame rate supported by your camera.

The Volocity Grid Confocal is compatible with a range of microscopes, cameras, XY stages and excitation sources. This allows you to choose the most suitable hardware for your application or budget, or integrate the system with your existing hardware.

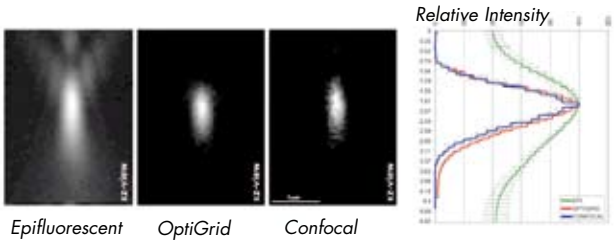
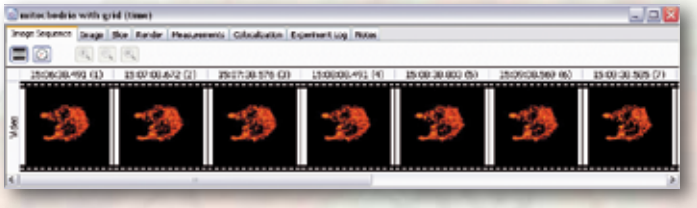


Figure 1. Axial point spread measurement. The photographs show the axial images (XZ plane) taken with traditional epifluorescence, OptiGrid structured illumination, or a typical modern confocal microscope. The graph shows the numerical measurements of the intensity of out-of-focus light as the mean ± standard deviation of seven different specks measured in both XZ and XY planes.

Independent tests have shown that the OptiGrid implementation of structured illumination microscopy can perform with optical sectioning characteristics that are extremely close to those of a modern confocal microscope.

The Volocity Grid Confocal configuration can be extended to include object detection, measurement, tracking and colocalization tools as well as image restoration.



Time lapse sequence of TMRE labelled mitochondria within a MIN6 beta cell. Courtesy of Professor Guy Rutter, University of Bristol.

For details of the theory behind the structured light technique used in the OptiGrid, see the following reference:
Optics Letters 22:1905-1907. 1997
Method of obtaining optical sectioning by using structured light in a conventional microscope
M. A. A. Neil, R. Juškaitis, and T. Wilson

The Volocity Grid Confocal is supplied with the following items:
Hardware: OptiGrid structured light device from Qioptiq Imaging Solutions
Software: Volocity Acquisition, Volocity Visualization

Requires Windows or Mac OS. Additional hardware such as the microscope and camera must be compatible with Volocity. See the Improvision web site for full computer specification, TechNote 263 and a current list of supported hardware, TechNote 417:
www.improvision.com/support

Product specification and user interface in release versions may vary from that shown.