vthawk™

2D Array Scanning Laser Confocal Microscope

with

Integrated FRAP /PA Module

VisiTech international
Vision Technology for Science

VT-HAWK Confocal FRAP imaging system

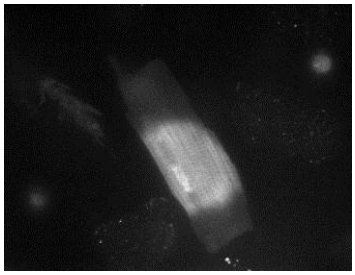
The vthawk from VisiTech International is a breakthrough in multi-beam confocal scanning. It combines ultra-high speed confocal imaging with patented selectable pinholes to provide users with optimal imaging conditions at all objective magnifications. Nanoscale technology is used to adjust 2500 pinholes producing high resolution confocal imaging at unparalleled speeds, without compromising flexibility. This multi-beam confocal scanning unit is also combined with a high precision point scanning FRAP module within the same scan head allowing the user to switch the laser input and the scanning optics between imaging and FRAP (or FLIP, PA and photo-conversion) modes within milliseconds, enabling accurate quantitation of the fluorescence intensity dynamics in precise, user defined, regions of the image.

Key features of vthawk

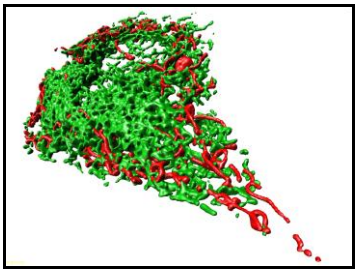
- ✓ **Real-time confocal imaging at speeds of up to 1000 fps**. This coupled with the 3D-RT™ module supports 'on-demand' 3D reconstruction of experimental data as it is being acquired.
- ✓ **The low photo-bleaching characteristics** permit long duration experiments of photosensitive samples, with minimal phototoxic effects.
- ✓ **Selectable pinhole sizes** permit users to vary the degree of confocality and throughput to match their experiment requirements for optimal imaging conditions.
- ✓ **The vthawk is a fully self-aligning system**. The dichroics and filters can be exchanged on-site; there is no requirement for factory returns in order to change the dichroic/filter configuration. The patented dichroic design requires no alignment of the dichroics to maintain image registration.
- ✓ **Fully integrated intelligent speed control** provides perfect synchronisation between scanner, camera and other devices. Random striping and field to field intensity variations associated with other technologies are a thing of the past. This also makes easy work of synchronising frame transfer cameras, preventing the appearance of image streaking associated with other solutions.
- ✓ **Transition from photo-bleach to imaging in milliseconds.** Glean the maximum information from the critical initial onset period of photo bleach recovery due to the swift transition time.
- ✓ **Flexible photo bleach scanning regime.** Highly efficient optics provides optimal laser beam delivery at the sample, resulting in diffraction limited bleach spots and well defined edges for multiple ROI bleach regions of any shape.
- ✓ **Fully integrated FRAP module.** The FRAP module is totally contained within the confocal head and thus requires no additional valuable bench space.
- ✓ **Variable pre and post bleach capture rates.** Multiple capture rates optimise temporal resolution for each stage of photo-bleach recovery, from fast capture for the initial onset to time lapse when approaching the plateau, thus reducing the likelihood of imaging induced photo-bleaching.
- ✓ **FRAP, confocal and wide field imaging without changing optical paths.** Due to the advanced optical techniques employed in the vthawk, FRAP type experiments can be combined with wide field and/or confocal imaging without changing the external optical path
- ✓ **Uses existing laser merge module.** The laser merge module and fibre connections used for imaging are also used by the FRAP module without compromising the performance of either mode.
- ✓ **Automatic camera protection.** An ultra fast shutter automatically synchronised with the bleach phase protects cameras while bleaching regions are illuminated.

Specifications

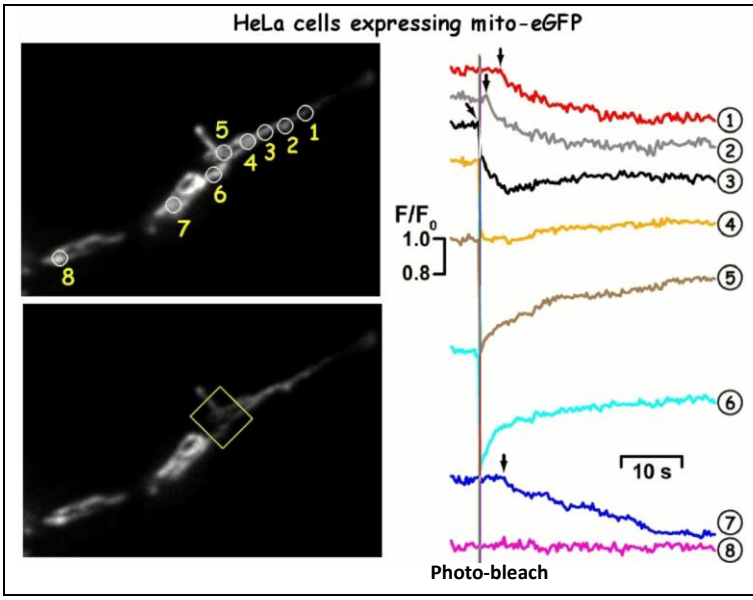
Pinholes (software selectable)	From 10um to 64 um diameter
Scan rates	Up to 1000 fps
Excitation changer	AOTF (4 or 8 channels)
Dichroic changer	Motorised, 4 positions, user exchangeable
Emission (barrier) changer	Motorised, 5 positions, user exchangeable
Dichroic alignment	Not required (self-aligning)
Camera synchronisation	Included
Camera and microscope i/f	C-mount
Interlocks	Key switch and interlock plug
Microscope compatibility	Upright and Inverted
Wavelength range	Near UV to near IR



Isolated Rat Ventricular Myocyte loaded with Fluo4



COS-1 Cell expressing Mit-dsRed1 & Mito-dsGreen1



The lower image identifies the region that was photo-bleached using 488nm excitation for a duration of 250ms

The graph plots the time history of the average fluorescence intensity in each of the regions identified in the upper image

Arrows on traces 1,2,3 and 7 highlight increasing delays in onset of fluorescence loss due to increasing distances from the photo-bleach site

Traces 5 and 6 show recovery of fluorescence intensity following the photo-bleach.

Trace 8 indicates an isolated structure

Images courtesy of Prof P. Lipp, Molecular Cell Biology, Homburg/Saar Germany

For more information contact

VisiTech International Ltd
Unit 92, Silverbriar
Enterprise Park (East)
Sunderland
SR5 2TQ
U.K.
Tel: +44 191 5166 255
Fax: +44 191 5166 258
email: sales@visitech.co.uk
web: www.visitech.co.uk

VisiTech International
Ballantyne One
15720 John J. Delany Drive Suite 300
Charlotte,
NC 28277
USA
Tel: (704) 926 6555
Fax: (704) 841 9314
email: sales@visitech.co.uk
web: www.visitech.co.uk