



Imaging Insects with Digital Slide Scanners

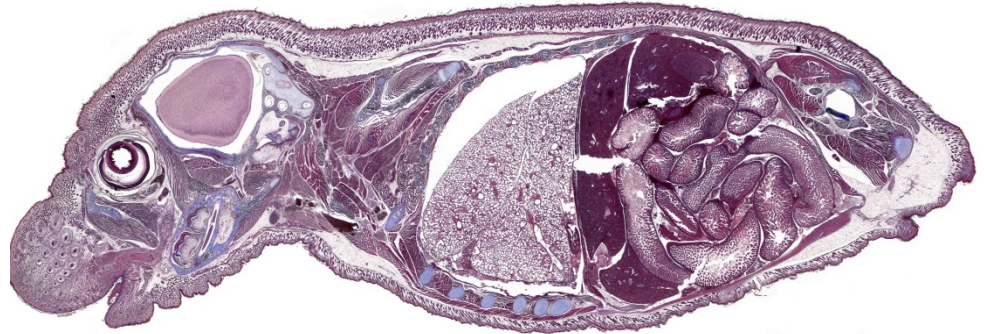
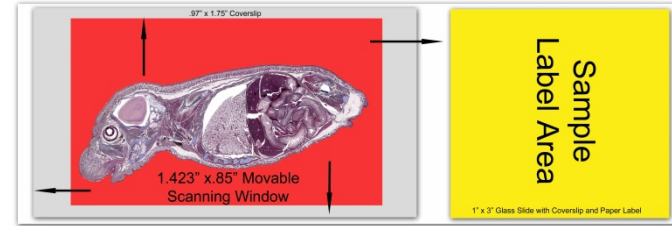
An introductory guide to what is available today from Meyer Instruments, Inc.

Scanning History

The first digital slide scanner based on film scanner technology was designed for Pathology. The intended use was to image and share tissue from whole histological 1x3” glass slides.

- Basic instrument consisted of a modified 35mm film scanner and a modified slide holder
- Meyer Instruments, Inc. was the first to patent, and the product the **PathScan Enabler** was launched in 1995

The PathScan Enabler IV today



Scanning History

The first digital slide scanner based on microscope technology was developed in early 1975. The intended use was to image cells from histological 1x3” glass slides.

- Primary use was to facilitate and enable high speed image acquisition of cells for clinical purposes
- The product was never fully implemented or marketed

Honeywell's 1975 patent

“A scanning microscope system with automatic cell-find and autofocus”

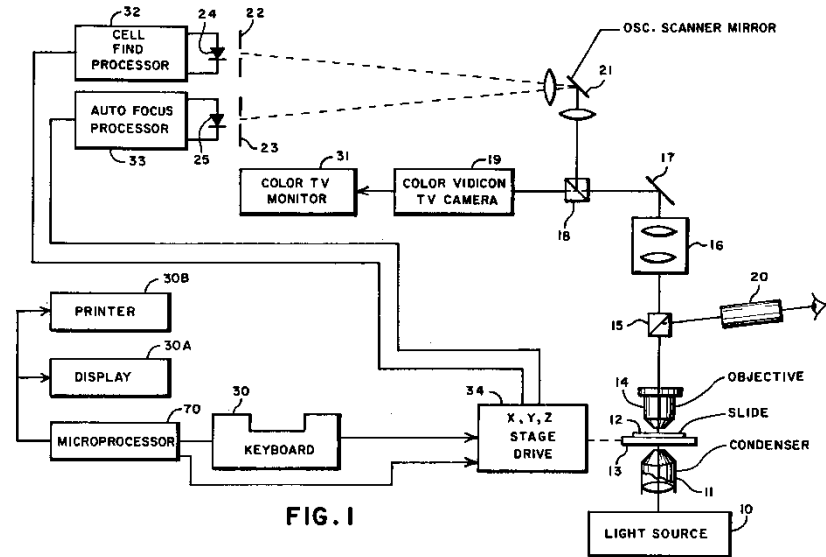


FIG. 1

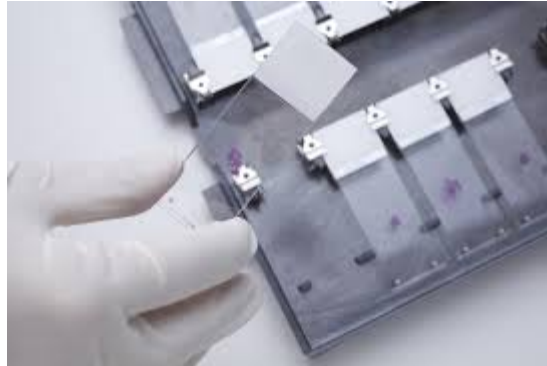
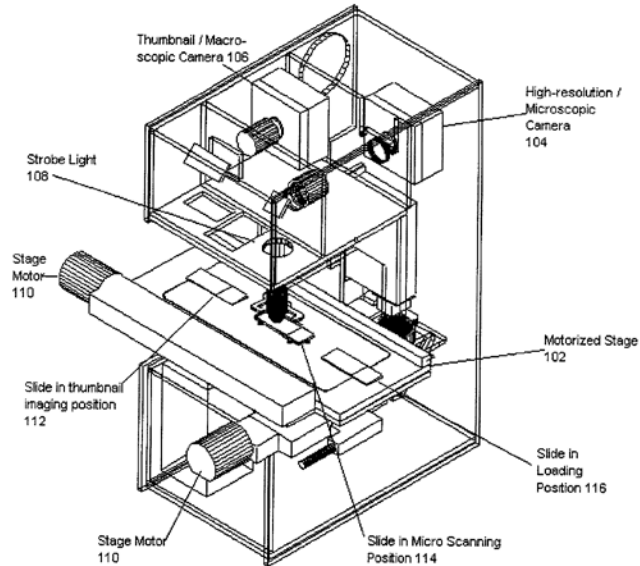
Scanning History

Subsequent microscope technology based digital slide scanners were developed in early 2001. The intended use was to capture high resolution images from histological 1x3” glass slides for pathology use.

- Basic instrument consisted of a research grade microscope with motorized X,Y and Z control, a camera, stitching software and a computer workstation
- Most were big, cumbersome and very expensive

Interscope 2001 patent

“A microscope based design for pathology use”



Scanning History

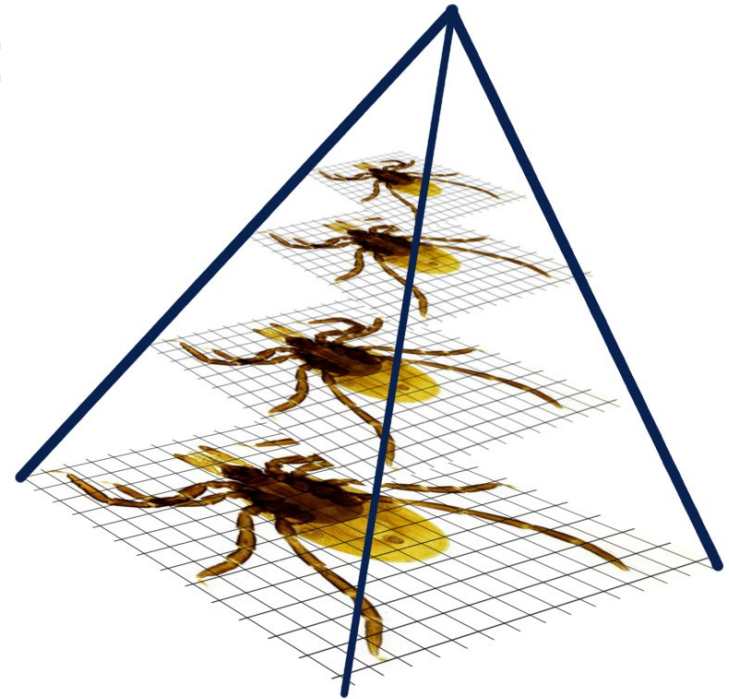
Numerous companies followed with other microscope designs, including:

- Hamamatsu, Aperio, Zeiss, Leica, Nikon, Olympus, Ventana, GE, Mikron, Perkin Elmer, Sakura, Huron, Motic, Objective Imaging and others
- Most are only capable of scanning one plane of focus (Z focus is not possible)

Imaging Insects with Scanners

Recommended requirements

- Scanner with XY and Z focus control
- Extended depth of field (EDF) software
- Enhancement software



Imaging Insects with Scanners

Scanner companies with XYZ imaging control to consider include:

- Motic, Objective Imaging and Hamamatsu



Imaging Insects with Scanners

Companies with Extended Depth of Field (EDF) software to consider include:

- Media Cybernetics www.mediacy.com
- Motic www.moticusa.com
- Huvitz www.microscope.huvitz.com
- HeliconSoft www.heliconsoft.com
- Zerene Systems www.zerenesystems.com

Imaging Insects with Scanners

Companies with Image Enhancement Software to consider include:

- Adobe Photoshop www.adobe.com
- Media Cybernetics www.mediacy.com
- ImageJ www.imagej.nih.gov/ij/index.html

Advantage of Scanners

Compared to conventional microscope-camera based photography:

- Entire insect can be captured at higher resolution
- Insect is entirely in focus
- Larger, entirely in focus insects can be printed on large format printers for stunning posters

Conventional microscope-camera photography allow only a single frame with limited field of view



Scanners create mosaic images in XY & Z resulting in an overall superior picture



Image Stitching in X-Y, 10x magnification



Image Stitching in X-Y-Z, 10x magnification with Extended Depth of Field (EDF)



Sample images using the Motic VM600 digital slide scanner Helicon, Image-Pro Plus and Photoshop



Sample images using the Motic VM600 digital slide scanner Helicon, Image-Pro Plus and Photoshop



Sample images using the Motic VM600 digital slide scanner Helicon, Image-Pro Plus and Photoshop



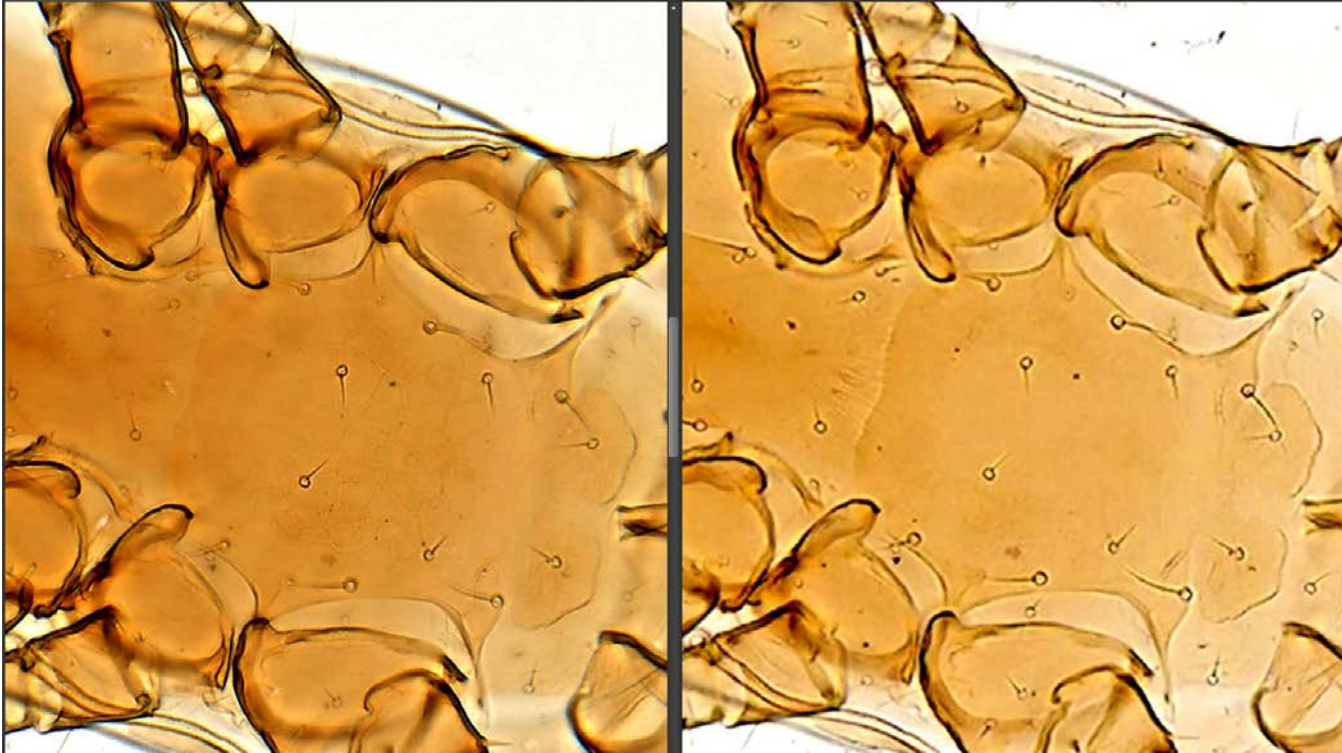
Sample images using the Motic VM600 digital slide scanner, Helicon, Image-Pro Plus and Photoshop



Sample images comparing 3 different HeliconSoft EDF image algorithm's



Sample images comparing using 40x objective verses 20x objective



Final sample image using 40x objective and the Motic VM600 scanner with HeliconSoft EDF software





Hypoaspis s.l.
Geolaelaps
sp. Moso



NM: Sandoval Co.
Placitas
PES-LA-1115
II-III: 2000
cy Mossy Creek



Lets look live at the Motic VM600

- Also using Helicon Soft
- Also using Photoshop
- Also using Image-Pro Plus

Advantages over normal microscope photography

- Entire insect can be captured at higher resolution
- Insect is entirely in focus
- Larger, entirely in focus insect can be 'jumbo' printed

Motic VM600 Slide Scanner

- Microscope based design
- Least expensive XYZ slide scanner on the market
- Scans with 2x, 4x, 10x, 20x, 40x objective's
- Comes complete with computer imaging work station
- Many optional features include distance remote control
- Files can be exported in a variety of image formats
- Easy set up and use

Objective Imaging Scanner

- Microscope in a box based design
- Scans with single 20x high n.a. objective
- Integrated computer with touch screen makes for very compact footprint
- Fast two slide scanning capacity
- Built-in extended depth of field (EDF) software
- Files can be exported in a variety of image formats

Hamamatsu Slide Scanners

- Microscope in a box, true tri-linear array based design
- High performance XYZ walk away batch scanning
- Scans with single 20x high n.a. objective
- Comes complete with computer imaging work station
- High through put 6, 210, or 320 slide capacity
- Files can be exported in a variety of image formats
- Fluorescence optional available on all models

To image insects with scanners

- You must have a XYZ slide scanner
- You must have EDF software
- You must have Enhancement software
- You must have a powerful computer
- You must have professional training

To conclude, most slide scanners

- Are now a “microscope in a box design”
- Include a single 20x objective
- Do not allow Z focus stacks
- Allow multiple slide capacity
- Designed primarily to scan histology slides
- Are not intended to scan thick samples
- Will not (necessarily) scan insects well

Meyer Instruments, Inc.

- Independent microscope dealer for 28 years
- Distributor of digital slide scanners including PathScan Enabler, Hamamatsu, Mikron, Objective Imaging, Motic
- Designed and patented PathScan Enabler
- Developed Extended Depth of Field (EDF) algorithm for Media Cybernetics
- Created Realtime Telepathology Imaging System (RTIS)



1304 Langham Creek Dr., Suite 235 Houston, TX 77084

(281) 579-0342

www.meyerinst.com

www.realtimetelepathology.com