Delphi Microscope

World’s first fully integrated SEM and fluorescence microscope

Fully integrated
Delphi is an all-in-one solution for correlative microscopy thanks to its integration of both hardware and software.

Easy to use and fast workflow
The Delphi simplifies workflow and greatly reduces time-to-result. The integrated design makes the system extremely fast thanks to seamless switching between imaging techniques. Sample loading to correlative imaging takes less than 3 minutes.

Small footprint
The system has the advantage of size and may be placed in any laboratory without the need for extra infrastructure.

Automated overlay
The Delphi eliminates the need to spend time on correctly overlaying your images. Precision mechanics and the use of a proprietary automated alignment technique ensure extremely precise, user-independent overlay of FM and EM images.
Correlative Light and Electron Microscopy (CLEM)

Delphi is an all-in-one solution for correlative microscopy. Its integrated design makes the system easy to operate and extremely fast thanks to seamless switching between imaging techniques. The system also has the advantage of having a small size and may be placed in any laboratory without the need for extra infrastructure.

Precision mechanics and the use of a proprietary automated alignment technique using the electron beam allows extremely precise, user-independent overlay of images.

The system has a small footprint and no need for extra infrastructure and can therefore be placed in any laboratory.

"The Delphi is a fast and convenient imaging solution, allowing us to move between light and electrons in one compact microscope."

Lucy Collinson, Cancer Research UK

Automated overlay

The Delphi eliminates the need to spend time on correctly overlaying the images since precision mechanics and the use of a proprietary automated alignment technique ensure extremely precise, user-independent overlay of FM and EM images.

The key to this alignment procedure is the physical principal of cathodoluminescence. Light is generated where the electron beam hits the glass coverslip. This light is detected by the camera of the fluorescence microscope and acts as a temporary fiducial marker.

Correlation of light and electron microscopy (CLEM)

The Delphi is a fast and convenient imaging solution, allowing us to move between light and electrons in one compact microscope.

Lucy Collinson, Cancer Research UK

Automated overlay
Delphi Applications

Typical application areas of the Delphi include whole cells cultured on cover glass, as well as thin sections of cells, tissue or other biological material like animal embryos.

Imaging thin sections

Using the Delphi for thin sections allows you to use fluorescent markers for pinpointing regions of interest, locating rare events, screening large areas and identifying subcellular structures on a molecular basis. The SEM contrast can be used to reveal ultrastructural details.

Imaging cultured cells

The Delphi provides a fast and straightforward method to study cell morphology and surface topology in correlation with specific proteins of interest in cultured cells. With this integrated CLEM system you have the unique opportunity to simultaneously image fluorescent markers together with the additional contrast and resolution made available by the SEM.
Delphi Specifications

General
- Sample loading time: To navigation camera in less than 5 s, To SEM/fluorescence microscope in less than 60 s
- Sample size: Up to 8 mm diameter
- Stage: Computer-controlled motorized X and Y and focus
- Power usage: 700 W at maximum power

Navigation
- Camera: Full color navigation camera with bright field and dark field modes and 20 – 120x magnification

Fluorescence
- Objective lens: 40x, 0.95NA, Plan Apochromatic
- Resolution: 290 nm at 550 nm emission wavelength
- Illumination: Four channel solid-state (LED) excitation source with digital On/Off and intensity control. Excitation at 395, 485, 575, and 650 nm
- Filter cube: Multiband Pinkel configuration optimized for DAPI, FITC, TRITC, Cy5 and other like fluorophores
- Camera: Scientific CMOS camera with 2048 x 2048 pixels (6.5 µm pixel size) and peak quantum efficiency of 60% at 600 nm with at least 40% QE over the range 420 – 800 nm

Electron optics
- Source: Long-lifetime high-brightness source (CeB6)
- Acceleration voltages: Adjustable range between 4.8 kV and 10 kV
- Magnification: 20 – 100,000x
- Resolution: ≤ 17 nm
- Detector: High-sensitivity backscattered electron detector

ODEMIS Integrated Software

General
- Specially developed open source software package
- Control of all optical settings
- Control of all SEM settings
- Fully automated alignment procedure resulting in accurate, unbiased overlays on every specimen
- Overlaid images directly visualized
- Control of the sample stage
- Auto-focus for both SEM and optical microscope
- History trail to track previous imaging locations
- Image formats: OME-TIFF, HDF5
- Data storage: Local, USB flash drive or network
- License: Open-source GPLv.2

System specifications

Dimensions
- Imaging module: 350(w) x 600(d) x 650(h) mm, excluding screens and pump
- Monitor: 24” monitor with PC and network router mounted

Delphi is a result of a unique collaboration between two Dutch companies, DELMIC (Delft) and Phenom–World (Eindhoven).

"Almost 70 years ago Philips built its first Electron Microscopes in Eindhoven. Already back then, Delft University played a key role", according to Emile Asselbergs, CEO of Phenom–World. "The Delphi is another example that fits in the Eindhoven–Delft tradition of jointly developing high–quality electron microscopy systems."