Thermo Fisher
S C I E N T I F I C

Array Tomography in Maps 3

Array Tomography enables you to create high resolution 3D image volumes on the basis of serial ultra-sections of biological tissue blocks.

Thermo Scientific™ Maps™ Software for Thermo Scientific scanning electron microscopes (SEMs) with the Array Tomography module greatly reduces the time and effort needed to record nanometer-resolution data sets from plastic-embedded cell and tissue sections. Array Tomography samples are typically carriers that carry hundreds of serial ultra-sections. Until now, the process of creating imaging regions in the same relative location in all sections required hours, or even days, of manual input from a skilled operator. In our Array Tomography workflow, the automatic Section Finder takes over this task.

High precision allows faster imaging

Automatic Position Refinement ensures that consecutive imaging regions are positioned precisely in the same relative location in all sections. No manual inputs are needed, other than assigning a Region of Interest for imaging. Perfect alignment of regions accelerates imaging, as it allows the imaging of smaller fields without danger of missing the target feature. The new suite of auto functions covers all alignments that are needed in long-term imaging: brightness/contrast, focus, and stigmation are maintained throughout long acquisition jobs. The high success rate greatly reduces the time needed for reviewing results and re-imaging failed acquisitions.

| Key features |
|---|
| **Clear user guidance** makes it easy to record any number of imaging regions in any number of sections |
| **Fastest setup and imaging** through advanced image-recognition features. |
| **High precision** of imaging region placement allows the imaging of smaller fields. |
| **Unique, fully automated workflow** contains no manual per-section actions—not found in any other Array Tomography software. |
| **Advanced auto functions** maintain image quality in long acquisition jobs. |
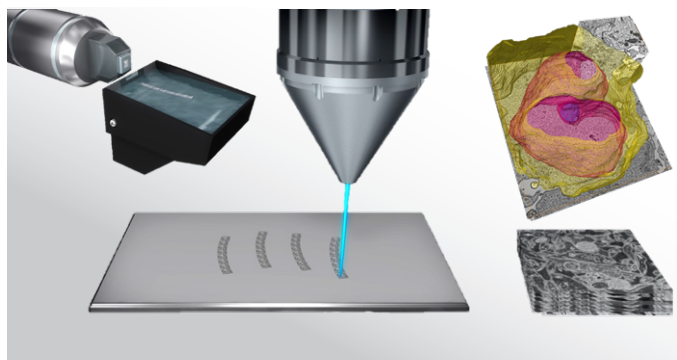
Figure 1: Overview of the Array Tomography workflow from microtome to electron imaging to 3D data visualization.

Guided step-by-step workflow

No more searching. A new interface in Maps Software contains several workflow panels for each step, from Overview Recording to Array Acquisition. Each panel contains clear instructions and all the buttons and tools needed for the current workflow step. Automation of all major workflow steps eliminates any per-section manual inputs that are present in other software solutions.
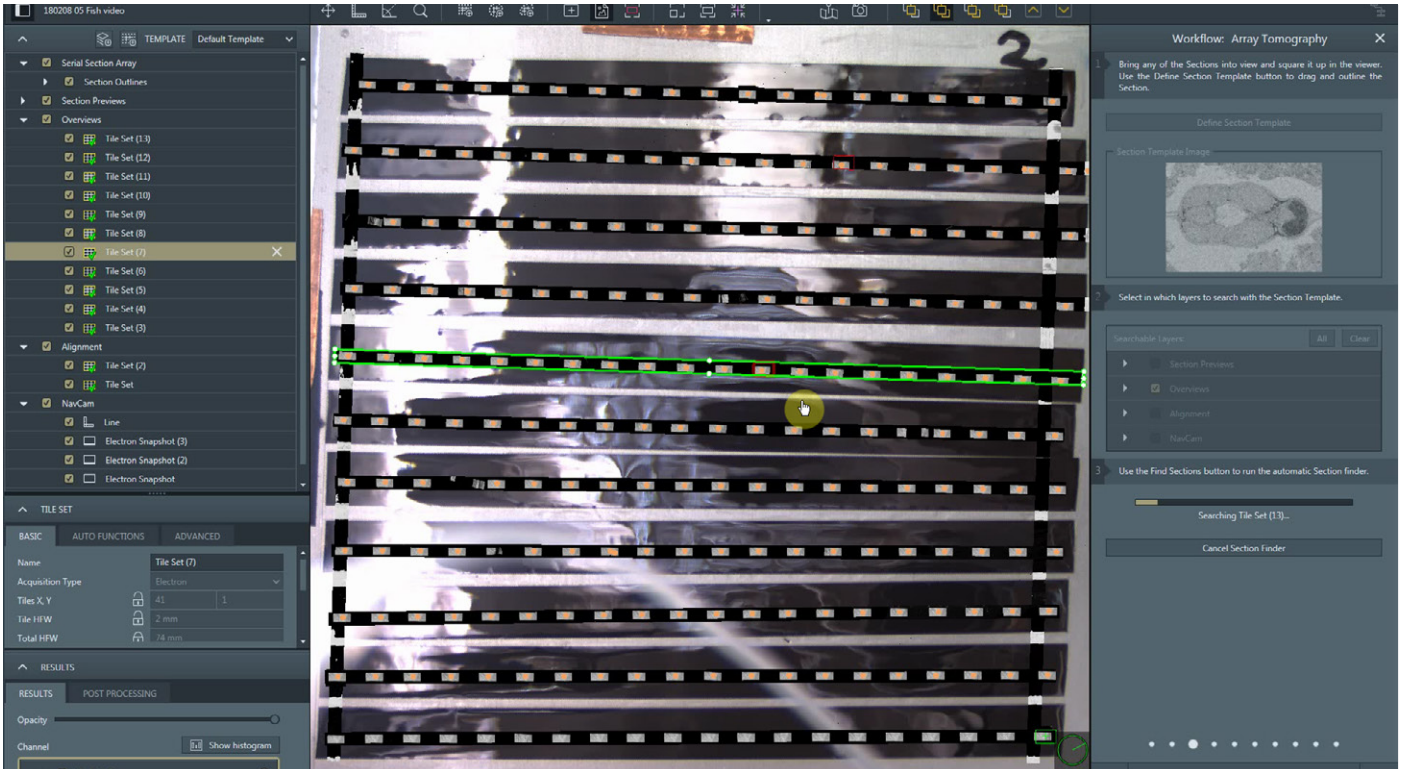
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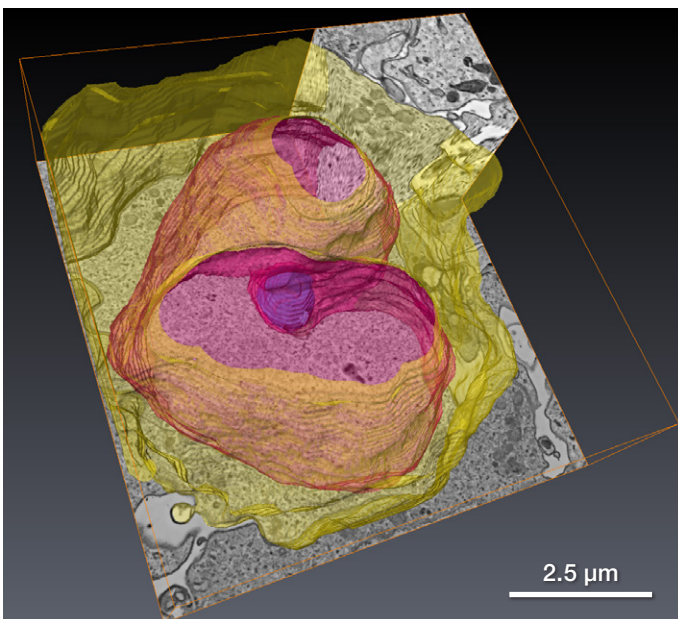
Figure 2: User interface of Maps 3 with Array Tomography.

Figure 3: 3D data set recorded from a sample of Dendrobaena veneta (earthworm) seminal vesicles. Grey image data: Ortho Slices along XY, XZ, and YZ of the data cube. Yellow: Cell membrane. Pink: Nucleus.

Figure 4: Array tomography data set recorded in Apreo 2 SEM. Reconstruction shows mitochondria, endoplasmic reticulum, telolysosomes, and nucleus in the cell body and apical dendrite of a neuron.

System requirements

Array Tomography is an optional plugin module for Maps 3 Software. Maps 3 Software is compatible with any microscope system running Windows 7 or Windows 10 and xT platform software.
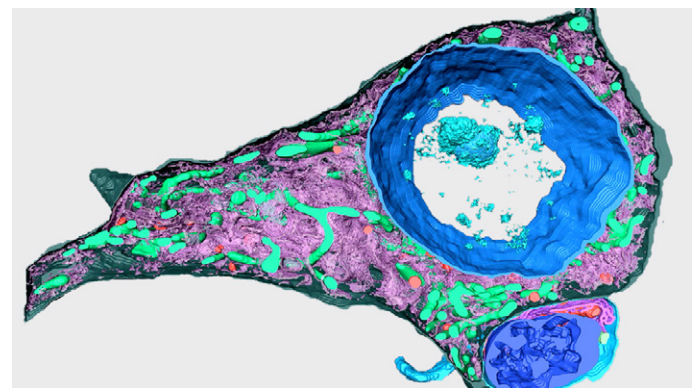
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