Amira for Life Sciences
Advanced 3D visualization and analysis software

Amira® is a powerful, multifaceted 3D software platform for visualizing, manipulating, and understanding data from computed tomography, microscopy, MRI, and many other imaging modalities. With incredible speed and flexibility, Amira enables advanced 3D imaging workflows for specialists in research areas ranging from molecular and cellular biology to neuroscience and bioengineering.

† Human brain. Visualization of a Diffusion Tensor Imaging (DTI) study.
Courtesy of Prof. A. Brawanski, University Hospital of Regensburg
Key Features

Import and export
- Bitmap formats: TIFF, BMP, JPEG, PNG, SGI
- Medical image formats: DICOM, Analyze
- Neuroscience formats: Nifti, Hoc, SWC
- Molecular formats: PDB and many more
- Finite element modeling: FIDAP*, I-DEAS, Fluent, Abaqus
- Geometric modeling and CAD: DXF, STL, VRML, Open Inventor
- Flexible raw data import
- Very large data support
*read-only

Process
- 2D and 3D image filtering
- Deconvolution and Z-drop correction
- Interactive / automatic slice alignment
- Image registration and morphing
- Interactive / automatic segmentation
- Skeletonization and tracing of microtubule, vascular and neural networks
- Dedicated editors for segmentation, filament tracing, and 3D image fusion and co-registration
- Surface generation
- FEM grid generation
- Tensor computation
- DTI based fiber tracking
- Powerful scripting interface
- Multicore support for many modules

Visualize
- Interactive high-quality volume visualization
- Orthogonal and oblique slicing
- Volume and surface rendering
- Isolines and isosurfaces
- Multichannel imaging
- Image fusion
- Vector and tensor visualization
- Support of structured and unstructured grids
- Molecular visualization

† Volume rendering of cleared spinal cord. Courtesy of A. Ertürk, Max Planck Institute of Neurobiology.

† Mouse thorax. Maximum intensity projection and surface reconstruction. Courtesy of Dr. E. Stepina and Dr. P. Hauff, Bayer Healthcare.

Analyze and measure
- Volume, area, and distance measurements
- Densitometry (gray value statistics)
- Filament network statistics
- Co-localization analysis
- Component separation, counting and shape analysis
- Arithmetic operations on images, vector fields, and unstructured grids
- Direct integration of the MATLAB® computation engine

Present
- Video generation
- Advanced key frame and object animation
- Active and passive 3D stereo vision
- Virtual reality navigation tools
- Single and tiled screen display
- Immersive environments
From image to understanding.
From a reconstructed geometry or from any imported 3D data, including time series, the Amira basic package delivers a wide range of visualization techniques and interactive manipulation capabilities. Through a comprehensive set of 3D post-processing tools, it offers a highly flexible and powerful 3D visualization and simulation platform.
Amira is available as a comprehensively equipped base package. However, in order to fit special needs in different application areas, the base product can be customized by adding functional extensions.

XImagePAQ provides advanced tools for image enhancement, simplified and automated segmentation, extensive measurement and quantification of objects, cells, and tissue features.

XNeuro provides tools for diffusion tensor imaging (DTI) studies, including tensor visualization, directionally encoded color maps (DEC), and fiber tracking. In addition, this extension supports the analysis of perfusion weighted MR and CT time series data.

XTracing allows detection and tracing of filaments or tube-like structures in very noisy images, enabling, for instance, analysis of actin fibers or microtubules in cryo-electron tomograms.

With XMolecular, Amira becomes a fully featured molecular visualization tool. Compared to other molecular software packages, Amira with XMolecular lets you seamlessly combine the advanced capabilities for voxelized image visualization and processing in the base product with state-of-the-art molecular visualization and editing.

XMesh is needed when 3D images are to be converted into 3D tetrahedral models for finite element (FE) modeling. Similarly, for visualizing results the XMesh extension offers high-quality scalar, vector, and tensor field display modules.

XWind enables analyzing, visualizing, and presenting numerical solutions from Finite Element Analysis (FEA) and Computer Fluid Dynamics (CFD) simulations, in applications such as biomechanics. XWind enhances the Amira XMesh extension with model export and simulation result import to and from most common 3rd party solvers. It also adds advanced post-processing of these simulation results.

XL Volume adds support for the visualization of image data that exceeds the available main memory of your computer using efficient out-of-core data management. It extends the use of many standard modules such as orthogonal and oblique slicing, volume rendering, and isosurface generation.

XPand allows you to create new custom components for visualizing and processing data, and file export/import, using the C++ programming language. It includes a development wizard for getting started quickly.

XScren is the extension whenever advanced visualization on large tiled displays or in immersive Virtual Reality (VR) environments is required. This extension supports 3D navigation devices, as well as fast multithreaded and distributed rendering.

Amira is available for Windows®, Mac OS®, and Linux.

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