Amira for FEI Systems 5.6

Advanced Visualization and Data Analysis

Release Notes
Version 5.6

Release Notes Amira for FEI Systems 5.6

Dear Amira User:

Amira for FEI Systems 5.6 is a new release dedicated to users of FEI electron microscopy systems and correlative microscopy workflows, including some important new features, enhancements, performance improvements, and issue fixes. Please read these Release Notes carefully.

We would appreciate your feedback regarding this version. If you encounter problems but also if you have suggestions for improvement, please contact us at vsghotline@fei.com.

We would like to thank you in advance for your efforts.

April 2014, the Amira and Avizo team

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New Licensing

New License Activation

A new license management has been introduced in Amira 5.6, which greatly simplifies operations such as upgrading or transferring licenses. Upon receiving activation codes corresponding to purchased licenses, simply copy/paste the activation keys into the License Manager to complete the on-line activation. Please refer to Amira License Manager Help for more details about license activation, transfers, and upgrades.

New and Enhanced Modules

New *DualBeam 3D Wizard*

The DualBeam 3D Wizard is dedicated to facilitate pre-processing of FIB-SEM image series acquired with FEI DualBeam systems. The Wizard guides the user through the following steps:

- Automatic y-voxel size foreshortening correction for stacks imported from FEI Auto Slice & View™ and shear correction.
- Bad slice removal and interpolation after alignment.
- Alignment, with optional reference and mask region in cut face area or fiducial outside milling area.
- Interactive cropping.
- Reduction of curtaining artifacts with FFT Filter.
- Noise reduction with Non-Local Means Filter.
- Intensity shading correction of background defined by threshold, box, drawing, or arbitrary mask image.
- Save data or project.

Some processing steps are optional and can be skipped. You can go back to a previous step to correct settings and apply again processing, unless the option “remove intermediate data” has been set in order to reduce memory consumption.

New modules *FFT* and *InverseFFT*

The new modules *FFT* and *InverseFFT* replace the deprecated *FourierTransform* module (still supported in scripts for compatibility though). The *FFT* module now supports the following result types: magnitude, phase, power spectrum, logarithm of magnitude, logarithm of power spectrum, and complex. The results are centered (lowest frequencies at the center).

The backward transform is now performed by module

	InverseFFT. It produces a simple real scalar field instead of a complex scalar field when the result imaginary part is not significant relative to the real part (see Tcl command *threshold* for details).
New *FFTFilter* module	The new module *FFTFilter* is available for frequency domain filtering of 2D and 3D images based on fast Fourier transforms. This module is a powerful tool to filter periodic noise or structures. Filtering large structures (low frequencies) can be used for shading corrections. Filtering small structures (high frequencies) can be used for smoothing. Two modes are available in this module. The Spatial mode exposes simplified parameters for setting structure size or stripe orientation and tolerance relative to input image. The Frequency mode exposes extended parameters for band filtering, notch filtering (spots), and directional filtering relative to the Fourier transform image. This latter mode allows export of the filtered FFT magnitude image for visual control in the frequency domain.
Enhanced *SpatialGraphStatistics* module	The module now computes the orientation of each segment in a SpatialGraph object and presents it as two additional columns *Theta* and *Phi* in the output spreadsheet.

New Electron Tomography Tracing features

	Amira for FEI Systems 5.6 introduces two new modules for tube-like structures detection and tracing in electron tomograms. A dedicated tutorial describes how to extract microtubules centerlines from electron tomograms.
New *CylinderCorrelation* module	This module calculates the cross correlation of an input scalar field with a parametric hollow or solid cylinder with optional correction for missing wedge artifacts. It can be used to enhance tube-like structures in an image, for example actin filaments or microtubules in an electron tomogram. The module is he first step in a before tracing the centerlines of these structures with *TraceCorrelationLines* module.
New *TraceCorrelationLines* module	This module traces lines based on a correlation field and an orientation field as computed by the *CylinderCorrelation* module. The output is a SpatialGraph object containing the traced centerlines. To get basic statistics for the generated lines, you may use the *SpatialGraphStatistics* module that has been enhanced to compute also the orientation of each centerline.

New and Enhanced File Format Support

Enhanced reader for *FEI SEM TIFF Series*	When importing FEI TIFF images, a new dialog displays image information including pixel size retrieved from FEI TIFF tags. This dialog allows you to set the slice thickness and to automatically trigger the DualBeam 3D Wizard once the stack is loaded. FEI TIFF tags such as acquisition settings are read as data parameters with a group section gathering parameters common to the whole stack.
New reader for *Auto Slice & View xml project format*	Amira can now directly import project files saved by FEI Auto Slice & View™ (ProjectData.xml). A dialog allows selection of the image series to be loaded, displaying a preview and retrieved image information including the target thickness. By default, the DualBeam 3D Wizard is automatically started once the stack is loaded.
Enhanced *MRC* reader	Previously, files with extension *.mrc* were read as *stacked coordinates* to account for the fact that *.mrc* files are typically the raw output of a tilt series and therefore, strictly speaking, not a volume. This has led to some confusion when importing files with extension *.mrc* that actually are reconstructed volumes. The MRC reader now creates uniform scalar fields, which allow more flexible operations than the stacked scalar fields used previously. A data parameter Sequence is set however, and displayed in data information to remind the user that the loaded stack may not be considered as a 3D volume. Extended MRC header information is read as data parameters, and can be accessed by using the Data Parameter Editor.

Bug Fixes

Besides adding new features and improvements, we have fixed issues and bugs. The following section presents a selection of those issues.

3281	***CalculusMatlab***	The module now works with MATLAB 2013b release.
4008	***DICOM Reader***	For some DICOM files the voxel size was not read correctly.
4014	***InterpolateLabels***	The module now works when the resulting label field is larger than 2GB.
4070	***Crash with some networks***	Certain complex networks with many objects and display modules were crashing.
4090	***MaterialStatistics***	[MacOS] The MaterialStatistics module no longer causes a crash when created from the Segmentation Editor.
4103	***Create menu***	[Mac OS] The non-functional submenus of the Create menu have been fixed.
4106	***Clipping issues***	[Mac OS] It is now possible to clip surfaces correctly on Mac systems with NVIDIA graphics cards.
4107 **4123**	***VolumeEdit***	The padding value is now correctly set on voxels replaced by the cut tool of VolumeEdit.
4113	***Crop Editor***	A crash occurring when connecting the Crop Editor to a MultiChannelField has been fixed.
4115	***Volren***	When rendering large volumes sometimes artifacts could be seen. This has been fixed.
4119	***DICOM Reader***	[Mac OS] The Stack Break Criteria dialog was not usable.

Technical Information

Supported Platforms

Windows – Windows XP (SP3 or newer), Windows Vista, Windows 7, Windows 8, 32-bit and 64-bit editions

Developer Option Requirements

Microsoft Visual Studio 2008 (VC++ 9) for 64-bit editions
Microsoft Visual Studio 2005 (VC++ 8) for 32-bit editions

Recommended Hardware

CPU: Multi-core CPU with ≥2 GHz
Main memory: ≥4 GB

Graphics card: A current desktop card from one of the main vendors (NVIDIA or ATI) with at least 512 MB video RAM. If OpenGL stereo support is needed (e.g., stereo projection or AmiraVR), an NVIDIA Quadro or an ATI FireGL / FirePro card with the appropriate driver must be installed.

For more information, please refer to:

http://www.vsg3d.com/sites/default/files/related/AvizoAmira-hardware_recommendation_fei-vsg_br.pdf

Installation Notes

Windows runtimes installation The installer for both Microsoft Windows distributions provides a mechanism to install the appropriate runtime libraries.

License Manager Due to security mechanisms in modern operating systems (e.g., Microsoft Windows User Account Control) Amira installation procedure needs to run with administrator privileges in order to be able to install the new License Management system (right-click the Amira installer icon, select “Run as administrator” from the context menu).

Note: Some virus scanner software can significantly slow down installation. If you observe stalling during installation, this is likely to be caused by a virus scanner program. Turning off the virus scanner when installing Amira usually solves the issue.

Manufacturer Information

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