Dear Amira for FEI Systems User,

With this document we would like to inform you about the most important new features, improvements, and changes in this version of Amira. 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 report them to fei-sw-support@fei.com. We would like to thank you in advance for your efforts.

December 2016, the Amira team
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OVERVIEW

The Amira for FEI Systems 6.3 release includes important new features, enhancements, performance improvements, and issue fixes.
AMIRA FOR FEI SYSTEMS – ENHANCEMENTS AND NEW FEATURES

VOLUMESCOPE MODULES - ENHANCEMENTS AND FIXES

**VolumeScope Live Tracker** The module for creating a preview of the image stack during acquisition of a VolumeScope serial blockface imaging microscope has been improved.

- The user can now specify a range of slices for preview before activating the tracker
- The module now automatically limits the number of slices for the preview volume according to available memory
- The module now reads the reference energy from the volumescope.inf configuration file. Previously, the reference energy was fixed to the first energy
- The Tracker has now a preview-only function that allows creating a volume without the tracking being active

**VolumeScope Stitcher** The module for stitching and aligning multi-energy and/or multi-tile images has been enhanced and issues have been fixed.

- The module is now re-designed as a Wizard module that partitions stitching into 4 steps: 1: determine the tileset layout, 2: select range of physical cuts and align them, 3: resample to a single volume, and 4: apply a selection of postprocessing filters.
- If Maps/VolumeScope has created the mosaic already, the module will use it thereby avoiding the time consuming creation of the mosaic object.
- The module now takes care that working units are Nanometer, if *Units Management* is turned on.

Both modules

- The location of the configuration file used to set-up the GUI of the modules is no longer hard-coded but can be selected by the user. This measure avoids long time-outs that typically occurred when the modules were used off-line.

AMIRA - ENHANCEMENTS AND NEW FEATURES

**NEW READER**

Amira provides a new reader for importing data in the VGL file format typically used by CT manufacturers such as Nikon. This format uses an XML header and references one or several associated data files with extensions such as .vol, .raw, .gz, .tiff, .jpg, or .jpeg.

**NEW RECURSIVE GAUSSIAN FILTER 2D AND RECURSIVE GAUSSIAN FILTER 3D MODULES**

Smoothes an image using a kernel based on a Gaussian distribution. Offers improved performances for large Standard Deviation input values. With the recursive implementation the computation time is independent of the Standard Deviation.

The new *Coordinate Type* port offers two options to enter the standard deviation:

- **Image**: The standard deviation is interpreted in voxels
- **Physical**: The standard deviation is interpreted in the current spatial unit

On a 1024x1024x256 volume with isotropic voxels the following performance can be achieved:
With Standard Deviation = (2, 2, 2)

- Standard mode = 49 sec
- Separable Mode = 5 sec
- Recursive mode = 18 sec

With Standard Deviation = (9, 9, 9)

- Standard mode = 28 mn
- Separable Mode = 37 sec
- Recursive mode = 18 sec

**NEW COMPUTE END NOTIFICATION MECHANISM**

This new feature allows the user to be notified when a computation is over. When a given computation takes over a specified amount of time, Amira will send an email to the user at the end of the computation.

Amira will summarize the computation time of the concerned module.

The settings are available from the preferences in the Notification tab.

Limitation: This notification is only available on server which do not require an authentication.

**NEW EXTRACT STATISTICS**

This module computes statistics on a Spreadsheet, Label Analysis or Image Analysis input and generates a Spreadsheet result containing these statistics. Computed statistics are the following:

- Mean
- Min
- Max
- Median
- Variance
- Kurtosis
- Skewness

The result Spreadsheet will contain one statistics table per table in the input spreadsheet. No statistics will be computed on columns of type "string": these columns will contain "0" values in the result Spreadsheet.
PYTHON DOCUMENTATION

Python Tutorial

This tutorial demonstrates how to expand Amira using existing tools from the Python eco-system. This tutorial builds an entire Python Script Object integrating the Fast Fourier Transform from the scipy package into Amira’s graphical user interface as an alternative to Amira’s own FFT.

PROCESSING OF TIME SERIES DATA

Process Time Series enables the processing of time series data. It is now possible to apply an entire segmentation workflow created in the Project View to an entire time series using the new Process Time Series module. The result is then presented as a time series in the Project View. To better indicate that a time series is a data object consisting of multiple 3D volumes, the color of the Time Series Control module has been adjusted to match the color of all other multi-volume data objects, e.g. Multi-Channel Field.

ENHANCED FEATURES

SPATIAL GRAPH STATISTICS

The Spatial Graph Statistics adds the Tensor measure, the orientation tensor per segment.

The Orientation Theta and Orientation Phi measures were previously based on the segment’s orientation going from start to end point which was erroneous for curved segment. The measures are now based on the new Tensor measure.

UNIT MANAGEMENT

The Units Editor can now be called on Spatial Graph and the spreadsheet extracted from this graph manages units.

UNSHARP MASKING

Performance has been improved. It now uses the Recursive Gaussian filter.
VOLUME RENDERING AND ISOSURFACE

Volume Rendering and Isosurface now align with Amira’s voxel centered bounding box.

In the image below, left is Amira 6.2 displaying Orthoslice in blue and Volume Rendering in purple. Right is same display with Amira 6.3.

MRC 2014

The MRC file format reader has been updated to support MRC 2014.

MISC ENHANCEMENTS

- Python Script-Object files can be opened or drag-and-dropped directly in the application.
- Extract Subvolume displays warning when the size of the extracted data is greater than the available memory.

DEPRECATIONS

- Option Preferences - Rendering - Legacy Surface has been removed from the GUI
- Option View - Background - checkerboard has been removed.
- VolumePro supports has been discontinued.

AMIRA XIMAGEPAQ EXTENSION – ENHANCEMENTS

ENHANCED FEATURES

NORMALIZE IMAGE FILTER

This module has now a Percentile mode. This mode automatically selects the input range between two given percentiles of the input image histogram.
LIST OF MEASURES IN LABEL ANALYSIS STORED BY CATEGORY

The documentation related to measures has been enhanced for increased readability. Measures are now categorized based on the measure groups presented in the Label Analysis module.

LABEL ANALYSIS

The former Excel XML export file format only writes the data array in the output file. A new format named Microsoft XML Spreadsheet 2003 – including statistics (*.xml) is created with the addition of a new tab in the exported Excel XML file with data of analysis statistics.
As the data array, statistics values are expressed in display units.

OPERATING SYSTEMS

Amira 6.3 runs on:

- Microsoft Windows 7/8/10 (64-bit). 32-bit is no longer supported.
- Linux x86 64 (64-bit). Supported 64-bit architecture is Intel64/AMD64 architecture. Supported Linux distribution is Red Hat Enterprise Linux 6.
- Mac OS X EL Capitan (10.11) and macOS Sierra (10.12)

In order to add custom extensions to Amira with Amira XPand, you will need:

- Microsoft Visual Studio 2013 (VC12) Update 4 on Windows.
- gcc 4.4.x on Red Hat Enterprise Linux 6.
- Currently, Amira XPand support is not available for Mac OS X El Capitan (10.11) nor macOS Sierra (10.12). It will become available again once Clang support has been completed.
Amira 6.3 provides many enhancements and solutions to known problems, including the following:

<table>
<thead>
<tr>
<th>SOLVED ISSUES</th>
<th>Item</th>
<th>Issue Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Align Slices</strong></td>
<td>45814</td>
<td>An error occurred when saving and reloading a project containing this module. This has been fixed.</td>
</tr>
<tr>
<td><strong>Analysis Filter</strong></td>
<td>46562</td>
<td>When applying an Analysis Filter a second time with different settings resulting in an empty result, the previous label field result was kept. Thus, as the spreadsheet was updated with the empty filter result, it did not match the label field result. This has been fixed.</td>
</tr>
<tr>
<td><strong>Arithmetic</strong></td>
<td>23253</td>
<td>Arithmetic module now reuses and updates its result when applied several times.</td>
</tr>
<tr>
<td><strong>Colormap Legend</strong></td>
<td>51869</td>
<td>The use of this module at the same time as Surface View module no longer causes an error.</td>
</tr>
<tr>
<td><strong>Cylinder Correlation</strong></td>
<td>45516</td>
<td>Results produced by the module could be null depending on CUDA memory defined in port CUDA Memory. This has been fixed.</td>
</tr>
<tr>
<td><strong>DICOM Import</strong></td>
<td>43807</td>
<td>When a precision loss or an overflow is detected, a warning dialog is now displayed to define how the data should be processed. The slope/intercept corrections are taken into account. Please refer to the Precision Loss/Overflow management chapter in DICOM import documentation.</td>
</tr>
<tr>
<td><strong>Extract Subvolume</strong></td>
<td>45654</td>
<td>Port Units is now disabled and set to global when a ROI Box is connected.</td>
</tr>
<tr>
<td><strong>Filament Editor</strong></td>
<td>44929</td>
<td>Computation for setting root on a large spatial graph has been improved.</td>
</tr>
<tr>
<td><strong>Label Field</strong></td>
<td>46556</td>
<td>The relabel Tcl method has been fixed and no longer corrupts the label field and its materials.</td>
</tr>
<tr>
<td><strong>Multi Planar Viewer</strong></td>
<td>43512</td>
<td>Performance when using Registration tool with VRT Render Mode has been improved.</td>
</tr>
<tr>
<td><strong>Plot 3D Orientation</strong></td>
<td>46149</td>
<td>When changing the module’s parameters between two exports to lattice, the lattice output was not updated. This has been fixed.</td>
</tr>
<tr>
<td><strong>Python</strong></td>
<td>46570</td>
<td>After creating a new object HxPythonScriptObject, it is now possible to save and reload a project.</td>
</tr>
<tr>
<td><strong>Resample</strong></td>
<td>53075</td>
<td>An error occurring when setting Resample module’s resolution in X, Y or Z dimension to the same value as the input data dimension has been fixed.</td>
</tr>
<tr>
<td><strong>ROI Box</strong></td>
<td>45405</td>
<td>When reconnecting a ROI box to a new input data, the minimum and maximum corners of the ROI box are no longer reset if they are inside the bounding box of the connected data.</td>
</tr>
<tr>
<td><strong>Script Module</strong></td>
<td>45425</td>
<td>It is no longer possible to load .tcl files as Script Object. Only .scro files can now be selected.</td>
</tr>
<tr>
<td><strong>Segmentation Editor</strong></td>
<td>44930</td>
<td>Contrast threshold slider associated to Magic Wand tool is now enabled in Amira/Avizo Lite.</td>
</tr>
<tr>
<td></td>
<td>45476</td>
<td>The Masking port for segmentation tools was sometimes disabled while it shouldn’t have been. This has been fixed.</td>
</tr>
<tr>
<td></td>
<td>53183</td>
<td>An issue occurring when using selection with lasso 3D on huge data has been fixed.</td>
</tr>
</tbody>
</table>
### Release Notes

- **Inconsistencies related to the display in the 3d viewer of transformed image have been fixed.** In the Segmentation Editor, the image is displayed untransformed. To avoid other display inconsistencies, it is not possible to display other objects in the 3d viewer. To this end, the Object visibility option of the viewer context menu is disabled.

- **Some artifacts could appear when using Fill holes command on large slices with a lot of regions. This has been fixed.**

- **When using the Interpolate command, the 2d viewers now correctly display the interpolated selection.**

#### Spatial Graph Statistics

- **The definition and calculation of tortuosity are now correctly set to the ratio Curve Length on Chord Length.**

- **The use of this module on a Spatial Graph with loops previously removed in the Filament editor no longer causes an error.**

#### Surface Editor

- **Closedness test has been restored.**

#### Surface View

- **An issue when displaying more than one surface using Intel graphics board has been fixed.**

#### TCL

- **The command load-avizo was no longer recognized. This has been fixed.**

#### Time Series

- **No extra image is created when reloading a project containing a time series data.**

- **The memory was not properly cleared after deletion of the Time Series Control module. This has been fixed.**

- **The synchronization between the Time ports of Time Series Control modules is now correctly managed by the Connection Editor.**

- **Using the Animation Director with Time Series data no longer causes an error.**

#### Trace Correlation Lines

- **The units of measurement are now shown in the ports when the units are activated**

#### Vector To RGB

- **Magnitude was taken into account even when the option Ignore Magnitude was checked. This has been fixed.**

#### Voltex

- **In case of multiple Voltex renderings, toggling one Voltex on/off no longer disrupts the display of the other ones.**

#### Voxelized Rendering

- **When a label field is connected to the module, the Gamma port is now hidden and the Colormap port is now displayed.**

#### XPand

- **XPand Extension Porting Guide has been updated with details to fix a compilation error about an inclusion of taglib/internal/version-impl.h. The version.cpp, winversion.rc and internal/winversion.h files should be removed from your Avizo local directory. Please refer to XPand Extension Porting Guide for more details.**

- **A compilation issue when calling the “FaceOctree::lineIntersectsTriangle” method has been fixed.**

- **DLL dependencies were not resolved properly at runtime, this has been fixed.**

- **Performance has been improved on McDArray.**

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Our team is continually focused on solving as many issues as possible to make your experience of Avizo as satisfactory as possible. To this purpose, we would appreciate your feedback regarding this version. If you encounter problems, or if you have suggestions for improvement, please report them to fei-sw-support@fei.com.

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