

RELEASE NOTES - AVIZO FOR FEI SYSTEMS 9.1.1, MAY 2016

Avizo for FEI Systems 9.1.1

3D Analysis Software for Scientific and Industrial Data

Dear Avizo User,

With this document we would like to inform you about the most important new features, improvements, and changes in this version. 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.

May 2016, the Avizo and Amira team

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OVERVIEW

The Avizo for FEI Systems 9.1 release includes some important new features, enhancements, performance improvements, and issue fixes.

For major changes introduced in Avizo for FEI Systems 9.0, please refer to the *Avizo for FEI Systems 9.0 Release Notes* document.

AVIZO FOR FEI SYSTEMS – NEW FEATURE

NEW SER READER

A new **SER** reader now supports TIA (Tecnai Imaging Analysis) Series Data files. The series data file stores a number of 1D or 2D images. Those images may be arranged in either a 1D line-scan or a 2D area-scan (or possibly higher dimensions).

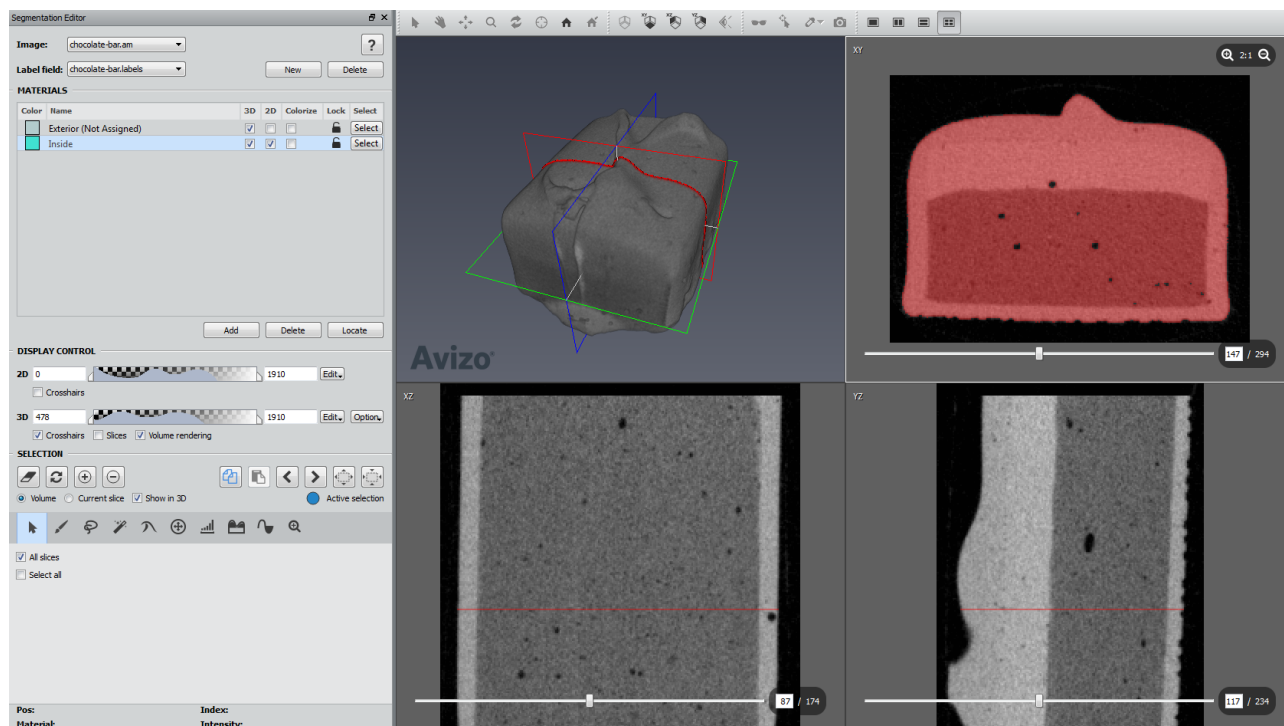
AVIZO – ENHANCEMENTS AND NEW FEATURES

USER-INTERFACE ENHANCEMENTS

Some components of the GUI, such as buttons or combo boxes, have been reworked (size, look and feel, color, margins, etc.), in order to have a more homogeneous interface on all platforms.

SEGMENTATION WORKROOM ENHANCEMENTS

Avizo 9.1 comes with an improved segmentation workroom. The user interface was redesigned with a focus on ergonomics and intuitiveness. In addition to the improvements of the user interface, new tools were introduced and other enhancements made.



NEW DISPLAY CONTROL AREA

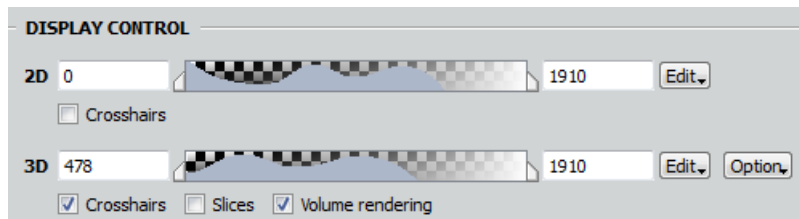
2D DISPLAY CONTROL

2D crosshairs can now be activated using the associated checkbox in the 2D display control area.

3D DISPLAY CONTROL

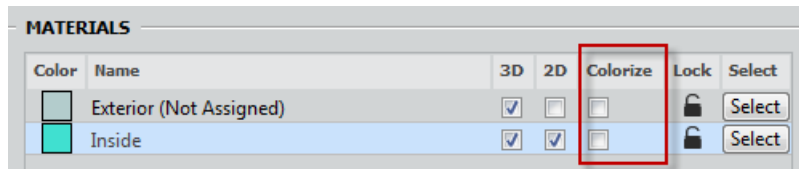
Two new checkboxes are available in the 3D display control area to activate 3D crosshairs and slices. The *Slices* checkbox is enabled only if *Crosshairs* is checked. When *Crosshairs* is selected, crosshairs and a frame appear in the 3D viewer. When *Slices* is checked, slices also appear.

A *Volume rendering* checkbox is available to activate a volume rendering visualization in the 3D viewer. A colormap allows the user to update its state. Volume rendering settings are now available in a dedicated menu *Option*.



MATERIALS LIST ENHANCEMENT

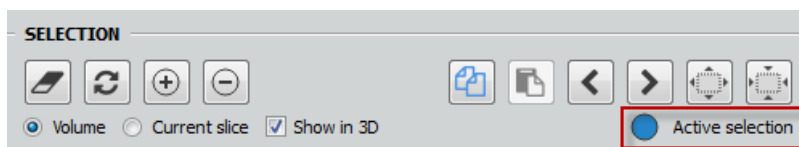
The visibility of each material color of the 3D volume rendering can now be set directly from the *Materials* list, using the corresponding checkboxes from the *Colorize* column. This column is enabled only if volume rendering is activated.



SELECTION AREA ENHANCEMENTS

SELECTION STATE

The state of the current selection is now displayed using a label in the *Selection* area. This label can display three different messages: *No selection*, *Active selection*, *Hidden selection*. The last two states indicate whether an in-plane selection is shown in one of the 2D viewers or located in a different slice.



NEW MASKING FEATURE

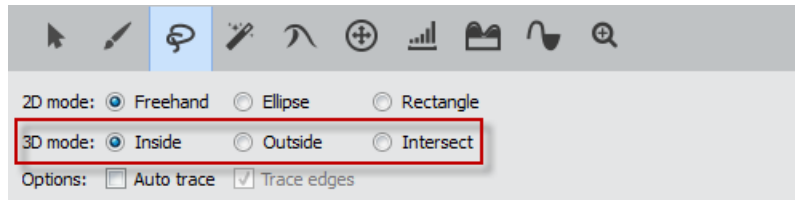
The masking feature allows the user to control the masking by setting its range and its visibility in 2D/3D viewers, and to enable/disable it in some tools. This masking feature is optional for the *Brush* and *Lasso* tools. It is used in the workflows for the *Magic Wand*, *Threshold*, and *TopHat* tools.



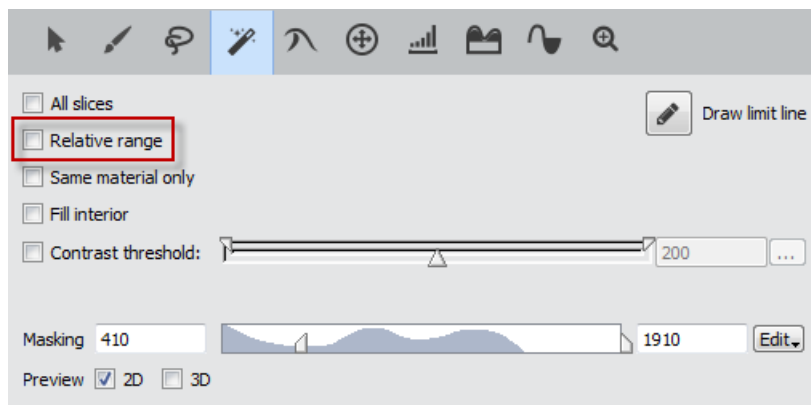
TOOL ENHANCEMENTS

The **Brush** tool icon now uses stipple circles and rectangles in 2D viewers.

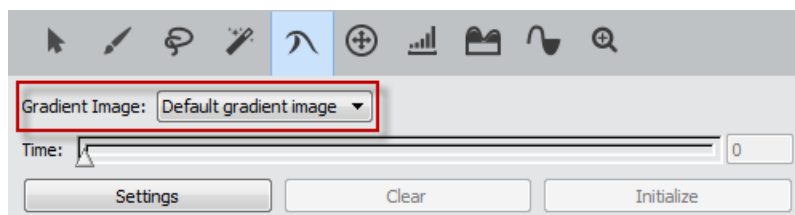
The **Lasso** tool can now interact in the 3D viewer. Three modes are available: *Inside*, *Outside*, and *Intersect*.



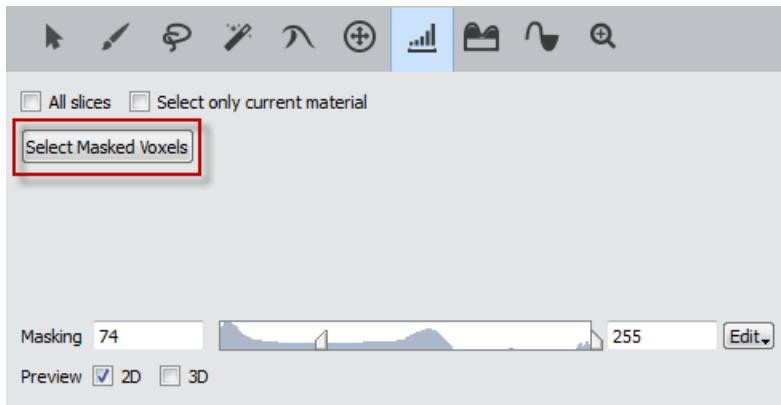
The performance of the **Magic Wand** tool has been improved when *All slices* is activated. The option *Absolute values* is now named *Relative range*, and when it is selected, the masking slider takes a relative policy.



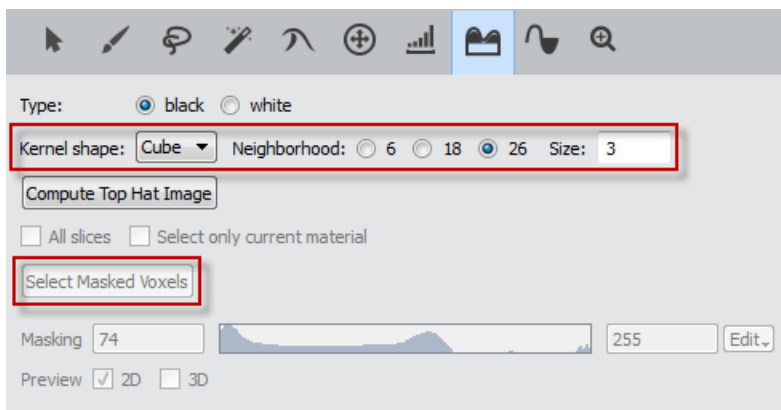
A new combo box is added to the **Propagating Contour** tool for selecting the gradient image used in this tool. The *Menu* button is now named *Settings*, and the *DoIt* button is now named *Initialize*.



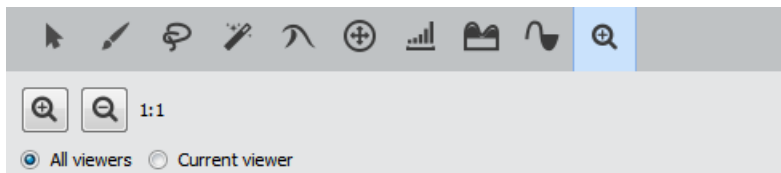
A new button *Select Masked Voxels* is added to the **Threshold** tool in order to compute the selection only when it's needed, not interactively.



In the **TopHat** tool, a new port *Kernel shape* now allows the selection and configuration of the kernel shape similarly to the erode/dilate group modules. A new button *Select Masked Voxels* is also available when the masking is available, and works as in the **Threshold** tool.



A **Zoom** tool is now available to manage the zoom factor on all and individual 2D viewers. A shortcut for the zoom tool has been added to the individual 2D Viewers.



VIEWER ENHANCEMENTS

The viewer layout is now stored and restored each session. The default is still 4-viewer mode.

Panning is now enabled in 2D viewers using the middle mouse button, and the scrollbars are only visible in the active 2D viewer.

The frames of the crosshairs in 2D and 3D viewers are now colored according to their orientation: **red** for XY plane, **green** for XZ plane, and **blue** for YZ plane.

When a 2D viewer is active, the **XY**, **XZ**, and **YZ** buttons of the viewer toolbar are enabled. Pressing one of these buttons causes the 2D viewer with the specified orientation to become the current viewer. These buttons are grayed out when the 3D viewer is active.

Slices in the 3D viewer are pickable and can be moved in *Interact* mode. The crosshairs can also be moved at a picked location by pressing and holding down the **Ctrl** key.

In the 3D viewer context menu, a new sub-menu *Visible objects* was added to the *Object visibility in viewer N* entry. It allows the user to show or hide a particular display module in the project directly from the viewer.

Zoom buttons are now available in each 2D viewer, allowing the user to specify the zoom factor for each viewer independently.

SEGMENTATION AND SELECTION MENU ENHANCEMENTS

The *Undo* action in the *Segmentation* menu is now moved to the *Edit* menu.

The *Orientation* sub-menu in the *Segmentation* menu is now grayed out when the 3D viewer is active.

Some sub-menus were removed from the *Segmentation* and *Selection* menus (*Current viewer*, *Image*, *Data window*, *Gradient* and *Color*).

NEW SEGMENTATION PREFERENCES

A new *Color* preference is now available in the *Selection Draw Style* area of the *Segmentation* preferences.

A new *3D Viewer Position* preference is now available in the *Viewers Layout* area of the *Segmentation* preferences. By default, it is set to **Upper Left**.



ENHANCED FEATURES

SCRIPTING ENHANCEMENTS

A new command **getState** is available for all modules and objects from the *Project View*. In the Console, type the name of the object followed by **getState**. It gives a view of the object's state, as done when saving the project.

A new command **isOfType** is also available for all the modules and objects from the *Project View*. In the Console, type the name of the object followed by **isOfType <type>**, where *type* is the object type you want to check. It returns 1 if it's correct, 0 otherwise.

OPEN INVENTOR UPGRADE

Avizo now uses Open Inventor 9.6 as its graphic engine. This upgrade includes bug fixes and improvements such as enhanced *Delayed* and *Sorted* transparency algorithms, and enhanced *JPEG 2000* and *3D TIFF* readers.

XPAND UPDATE

The new version of Avizo XPand is a major evolution bringing many enhancements to improve your programming experience. The new version introduces a more homogeneous API, is better documented, and will guarantee fewer compatibility breaks in the future. To reach this goal, the new version of Avizo XPand introduces some incompatible source changes. A porting guide included in the Avizo XPand distribution lists those changes. Please refer to this document for more information.

Custom extensions to Avizo can no longer be developed using Microsoft Visual 2010, as it is no longer supported by Avizo XPand. Microsoft Visual Studio 2013 should now be used on Windows operating systems.

NEW MODULES

Line Set Cross Contour shows the intersection of a line set and a cutting plane.

Point Cloud Cross Contour shows the intersection of a point cloud and a cutting plane.

Copy Parameters copies parameter bundles from one data set to another.

Variance operates on the first-order statistics of an image. It creates a result image where pixel values are functions of values of this pixel in the initial image and its neighborhood of a specified size. In order to calculate this value, a local histogram is calculated.

Tcl Command Module allows execution of Tcl code.





Thickness Map computes the local thickness for each voxel in a binary image, defined as the diameter of the largest ball containing the voxel and entirely inscribed in the object.

Spatial Graph to Volume generates a binary or label map that provides a voxel-based representation of a continuous geometry input, which can be an opened or closed surface, a set of lines or spatial graph, or a set of points.

ENHANCED MODULES AND EDITOR

A new option is added to the **Register Images** module to disable rotation. If this option is checked, the transform used will have no rotation component. It can be used with any transform settings.

Ortho Views now displays only one viewer for 2D data. Furthermore, this module now offers several clipping types:

-  No clipping is applied.
-  The clipping direction is either the direction of the normal to the plane or its inverse, depending on which one forms the largest angle with the camera direction.
-  The clipping direction is the direction of the normal to the plane.
-  The clipping direction is the opposite direction of the normal to the plane.

The **Simplification Editor** algorithm has been improved to dramatically reduce the occurrence of intersections in the computed simplified surface.

ENHANCED READERS

The **JPEG 2000** reader now supports large JP2 images, accessing only the part of the images that is needed. This avoids loading unnecessary data and reducing peak memory usage.

The **ANU Netcdf** reader now adds support for stacks of simple 3D volume tomography data.

Tessellation options can now be set for **CATIA5**, **IGES** and **STEP** readers, such as the linear tolerance, the angular tolerance, and the maximum triangle edge ratio. **IGES** and **STEP** readers now also allow loading of edge data, like the **CATIA5** reader.

ENHANCED WRITER

The **DICOM Export** now allows the user to export 3D DICOM by selecting *Enhanced CT* from the existing dialog which pops up when saving as DICOM.

OPERATING SYSTEMS

Avizo for FEI Systems 9.1 runs on:

- Microsoft Windows 7/8/10 (32-bit and 64-bit). This is the last version of Avizo for FEI Systems to support 32-bit Windows.
- 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 10.7, 10.8, and 10.9 (64-bit).

In order to add custom extensions to Avizo for FEI Systems with Avizo **XPand**, you will need:

- Microsoft Visual Studio 2013 (VC12) Update 4 on Windows. Microsoft Visual Studio 2010 is no longer supported.
- gcc 4.4.x on Red Hat Enterprise Linux 6.
- gcc 4.2.x, provided by the standard Xcode development environment on Mac OS X.

KNOWN ISSUES

Here is a list of known issues that will be fixed in the next release of Avizo for FEI Systems.

- Colormap ports in the Properties Area are hidden when the *Show connection ports in Properties Area* preference is unchecked. If you are bothered by this behavior, go to the *Edit* menu, open the *Preferences*, and uncheck the option in the *Layout* panel.
- Batch jobs are not working properly on any supported platforms.
- **Thickness Map** module doesn't belong to the right category, for now you can find it in *Experimental / Measure and Analyze* category or by typing the module's name in the search field of the *Object Popup*.

SOLVED ISSUES

Avizo for FEI Systems 9.1 provides many enhancements and solutions to known problems, including the following:

Align Surfaces	42587	The computation now works correctly when an ROI is attached to the module.
Analysis Filter	37869	Running multiple Label Analysis Filters could result in incorrect label fields. This has been fixed.
Animation Director	34867	A pack&go project using the Animation Director is now correctly loaded and played.
	37632	A Tcl interface has been added to the embedded Movie Maker module of the Animation Director.
	36253	Deleting a selected event now works properly.
	41711	When side-by-side stereo mode is selected in the Movie Maker video export, the produced video now has the expected size.
DICOM Reader	41956	Slice spacing (0018,0088) and slice thickness (0018,0050) tags are now taken into account to define z voxel size when a single slice is loaded.
Extract Subvolume	30646	Applying this module to a 2D data set works correctly now.
	38165	In some cases, the dragger was not correctly positioned. This has been fixed.
Filament Editor	40312	Creation of an inconsistent Spatial Graph is now impossible.
Generate Surface	40459 37835	The module no longer modifies its input label field by changing some of its parameter bundles.
	37770	The Tcl command showMaterialList allowing to select a single material to generate a surface from has been restored.
Installer	37625	Avizo Lite is now used for file associations.
JPEG 2000 Reader	23235	Large JP2 files can now be read.
Label Analysis	41306	When the Seek Label tool is activated, the cross-hairs and slice are now positioned correctly on the material currently selected in the list.
Labeling	38085	The documentation has been improved to provide information about important usage requirements.
License Activation System	35601	Highlights are now used to indicate whether the activation code syntax is correct or not.
	36472	The Test button now checks not only the existence of the FNP license server but the connection too.
LS-DYNA Reader	40212	Deleted cells in time series data could cause errors in the rendering. This has been fixed.
Mask	30277	Material bundles are now copied to the module's result.
Material Statistics	39037	Units are now correctly exported when exporting the result spreadsheet to CSV format.
Pack&Go Export	36280	When saving a project as pack&go, data objects were saved in Avizo native format but retained their original file extension. The .am extension is now appended to the data original format.
Relabel	37868	16-bit label input no longer causes an error.
Remesh Surface	37822	Density contrast and Density range ports' visibility has been restored when a surface curvature is used instead of a density field.
Save / Export	37752	Data objects over 4GB saved in Avizo ZIP format are now correctly read.
	35783 39751	Files and projects can now be saved into folders containing non-ASCII characters in their name.
	38153	Syntax errors in a saved project or template project could prevent its

		correct loading. This has been fixed.
Scalebars	39989	The measure was not correct when the module was in fixed size mode. This has been fixed.
Segmentation Workroom	43234	A specific combination of Ortho Views display and use of Watershed tool could cause errors. This has been fixed.
	37974	Material lock statuses are no longer lost in the Segmentation Workroom when a Generate Surface module is attached to the label field.
	28505	Sometimes parts of the selected material were not replaced when using the Replace selection tool. This has been fixed.
	40262	The pointer of the Lasso tool cursor for setting control points has been restored for more accuracy.
	34507	Using the Pick tool on large data no longer causes an error.
	43351	When the Segmentation Workroom preference selection draw style was not set to the default value (transparent), operations on the label field in the project view could fail. This has been fixed.
Slice	38081	2D data sets are now displayed correctly.
Snapshot	39595	An error occurred when the snapshot size was too big due to too big values of render tiles and antialias options. This has been fixed by limiting the snapshot size and therefore the render size and antialias values. A warning is displayed when the user tries to specify a value that would result in a too big snapshot.
	41814	Export to PDF format has been fixed.
Surface Area Volume	38999	Even when the surface is not close to the origin, the volume results are now correct.
Surface Editor	37696	The draw tool to highlight triangles now works when 'visible triangles only' is checked.
	35331	The Fix Intersections option now displays the correct number of intersections fixed.
Surface Thickness	31434	Displaying a large surface with its thickness information could produce artifacts in the colorization of the surface. This has been fixed.
Surface View	40124	An Avizo license was abnormally required when using the module. This has been fixed.
TIFF Reader	37800	Data sets over 4GB saved in Avizo 3D TIFF format are now correctly read.
Units Editor	42979	The resolution values displayed in the Units Editor are now correctly updated after the display units are changed via the Preferences dialog.
Volren	36760	Performance issues when using spin animation are now fixed.
Volume Rendering	33240	A display issue could be observed when using Volume Rendering combined with spherical projection on high resolution 3D datasets. This has been fixed.
	34322	Initializing the module with Tcl commands and then displaying its properties no longer causes an error.
	40850	Zoom is no longer reset when moving through time steps of a time series data.
Voxelized Rendering	35868	The display could freeze and/or display low resolution images when rendering time series data. This has been fixed.
XPand	30792	Example package can now be generated on Mac OS X 10.9.
XScreen	36687	Limitations are now described in documentation.

Our team permanently focuses 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.