thermoscientific

Release notes Amira–Avizo Software Version 2019.2

3D data visualization and analysis

The aim of this document is to inform you about the most important new features, improvements and changes in this version of Thermo Scientific™ Amira-Avizo™ Software.

Please read these Release Notes carefully.

We would appreciate your feedback regarding this version. If you encounter any problems or have any suggestions for improvement, please do not hesitate to contact us at <u>FRBOR.3d_hotline@thermofisher.com</u>.

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This version introduces the merger of Amira-Avizo and Amira-Avizo for EM Systems, which consists of the following:

- Merging the installers of Amira Software and Amira Software for EM Systems into one installer.
- Merging the installers of Avizo Software and Avizo Software for EM Systems into one installer.
- Avizo.exe and AvizoEM.exe have been merged into one executable: Avizo.exe. All features of Avizo Software for EM Systems are accessible from Avizo.exe with Avizo Software for EM Systems license.
- Amira.exe and AmiraEM.exe have been merged into one executable: Amira.exe. All features of Amira Software for EM Systems are accessible from Amira.exe with Amira Software for EM Systems license.
- Units settings are now saved in project files (see **Units saving in project files** paragraph in <u>Compatibility notes</u> section).

Avizo Software Lite and Amira Software: Enhancements and new features

2D Scale Bar

A 2D Scale Bar can now be connected to an Ortho Slice module, which overlays a bar on the slice. The length of the bar, which can correspond only to a rounded value, is indicated by the Length slider value.

If units are activated (Avizo or Amira XImagePAQ), this is also indicated.

The bar length remains valid and unambiguous during 3D animations, regardless of the camera type and orientation.

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푸	Y Position Offset:	▲ ▶ 0.90		

Figure 1. 2D Scale Bar showing the bar length of 20 $\mu m.$

Minor updates to Segmentation Editor

A button has been added to Rename the current label field.

The size of the brush tool can now be modified by rolling the mouse wheel while holding the Ctrl key. Updating its size via the slider also offers visual feedback in the viewers.

New Physically Based Rendering Mode for Volume Rendering

A new Physically Based Lighting mode has been added to the **Volume Rendering Settings** display module. This new mode becomes the default for the **Volume Rendering** display module. The Physically Based Lighting effect provides lighting using an advanced BRDF (Bidirectional Reflectance Distribution Function) model that provides more realistic rendering with better depth.



Figure 2. Standard Volume Rendering versus Physical-based shading Volume Rendering.

The introduction of this new mode is also an opportunity to simplify the user interface of the **Volume Rendering Setting** module by introducing a gradual complexity (by default, the least-used parameters are not displayed) and by removing deprecated parameters (slice alignment).

Version 2019.1			Version 2019.2		
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			Composition: Alpha Sum Min Max Average		
			Interpolation Mode: O Nearest (no interpolation) I Linear Cubic		

Figure 3. Volume Rendering Settings user interface changes between versions 2019.1 and 2019.2.

Avizo and Amira Software XImagePAQ extension: Enhancements and new features

Texture Supervised Classification in the Segmentation Editor

The functionality proposed by the Experimental module "Texture Supervised Classification" is integrated with the Segmentation Editor workroom as a new tool.

Its usage is similar to the watershed tool, as you must first define markers for the different labels to be extracted. Texture features are learned from these markers and used to classify all pixels of the image. A mask can be applied to avoid labeling voxels with low confidence.

Watch a video illustrating the usage of this new tool in our Learning Center.



Figure 4. Volumescope SEM dataset of mouse heart muscle, segmented with texture classification and watershed post-processing. Data courtesy of Dr. Madesh Muniswamy from the Department of Medicine, UT Health San Antonio.

Colorize by Measure

The Colorize by Measure module generates a dynamic colormap that allows colorizing labeled objects according to a corresponding measurement, thanks to the spreadsheet generated by the Label Analysis module.

The generated colormap can be used by most display modules, such as Ortho Slice, Colorwash or Voxelized Rendering, provided they are connected to the Label Image that corresponds to the Label Analysis Spreadsheet. It may also be set manually as the Shared Colormap for this label image.

The Colormap Legend module must be connected to the Colorize By Measure module itself to produce a meaningful color bar.



Figure 5. Example of Colorize By Measure including Colormap Legend.

Known limitation: Voxelized Rendering does not support such a colormap when too many objects are present, which is typically in the order of 32,000 objects. A warning message will appear when the limit is reached.

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Recipe support on Linux

The Recipes workroom is now available on supported Linux platforms.

Amira-Avizo Software XBioFormats extension

The Bio-Formats library has been upgraded to version 5.9.2, and the Java Runtime Engine to 1.8.0_202.

Avizo Software for Industrial Inspection: Enhancements

Avizo Software for Industrial Inspection offers a new geometry fitting algorithm that provides improved performance and better quality than the previous PTB-certified algorithm. This new version grant backwards compatibility for test plans saved before Avizo Software version 2019.2 release. This backwards compatibility will remain for the next two years (Avizo Software standard algorithms' deprecation policy). You can upgrade an old test plan and use the new fitting algorithm by simply loading it and re-saving it. Note: depending on the fitted geometry type, the minimum number of points needed to be picked can be greater than in past releases.

Picking in 2D viewers to create fitted geometries has been improved to allow you to control fitted geometries in a more intuitive way.



Figure 6. Example of fitting a circle constraining it on an ortho slice that is on a given section.

Compatibility notes

Non-Local Mean Filter parametrization changes

The Non-Local Mean Filter has been improved with a new mode (GPU Adaptive Manifold mode) in Amira Software 6.7 – Avizo Software 9.7 versions. All modes have been grouped in the new module, **Non-Local Means Filter**. In this new module, the parameters have been refactored to have the same behavior for all modes. In Amira Software 6.7 and Avizo Software 9.7 versions, to achieve the same results as in previous versions, for the former GPU mode, the following parameters must be converted:

Parameter Name	Before	After	
	Avizo 9.7/Amira 6.7	Avizo 9.7/Amira 6.7	
Search Window	X*	$X \in 2\mathbb{N} \implies (X-1)/2$	
		$X \in 2\mathbb{N} + 1 \Rightarrow X/2$	
Local Neighborhood	Y	$Y \in 2\mathbb{N} \qquad \Rightarrow (Y-1)/2$	
		$Y \in 2\mathbb{N} + 1 \Rightarrow Y/2$	
Similarity Value	Z	\sqrt{Z}	

*If the Search Window was set to X in a version prior to Amira 6.7 / Avizo 9.7, it should be set to X / 2 if X was odd, in order to achieve the same results in Amira 6.7 – Avizo 9.7 or newer versions.

Units saving in project files

With this version, the activation/deactivation of units is saved in project files (.hx files) according to the units preference. Files saved before Amira-Avizo Software 2019.2 version will be handled in compatibility mode. If the units preference is not written in the project file during loading, the units are deactivated while loading and activated when done (if active prior to loading).

Volume Rendering Settings module

The ports of this module have been refactored. Files saved before Amira-Avizo Software 2019.2 version that contain a **Volume Rendering Settings** module are managed in compatibility mode. The new module is created, and the **Rendering** port is set to **Standard**. To use the new module, you must save the project using the new version.

Operating systems

Amira-Avizo Software version 2019.2 runs on:

- Microsoft Windows 7/8/10 (64-bit)
- Linux x86 64 (64-bit). Supported 64-bit architecture is Intel64/AMD64 architecture. Supported Linux distribution is Red Hat Enterprise Linux 7.
- macOS High Sierra (10.13) and macOS Mojave (10.14)

Avizo Software 2019.2 for Industrial Inspection and Inline Extension run on:

• Microsoft Windows 7/8/10 (64-bit)

To add custom extensions with Amira-Avizo XPand extension, you will need:

- Microsoft Visual Studio 2013 (VC12) Update 4 on Windows
- gcc 4.8.x on Red Hat Enterprise Linux 7
- XCode7 or greater on macOS

Solved issues

Arithmetic	AA-17900	Arithmetic module now takes into account the transformation applied to the input.
AvizoToGo	AA-20754	AvizoToGo can now read files larger than 4 GB.
Bio Formats	AA-20379	Some NHDR files would fail to load. This has been fixed.
	AA-17401	Some IMS (Imaris) files could fail to load. This has been fixed.
Clipping Plane	AA-19947	When setting the Points to Fit port, the Clipping Plane translation would not match the selected points position. This has been fixed.
DICOM loader	AA-20586	The scaling option of the DICOM loader is now correctly restored when reloading a saved project that includes some DICOM data.
Extract Subvolume	AA-11313	Extract Subvolume now keeps the same dragger box settings on each time step in a time series process.
Generate Surface	AA-16961	Generate Surface performance has been improved by disabling useless recomputation on module selection.
Histogram	AA-14823	TIndex and Threshold ports now return consistent values.
LDA Preferences	AA-9496	The maximum value for Video Memory slider did not always match the amount of vRAM on the graphics card. This has been fixed.
Licensing	AA-12987	The documentation has been improved to explain how to mix floating and node- locked licenses.

Mac	AA-20280	For Radeon Pro graphics cards, the Video Memory is now correctly computed in the LDA Preferences panel.	
	AA-20218	On Mac, in some cases, the computation of the available CPU memory was not	
	AA-20917	correct, preventing some features from working properly. The available CPU memory is now correctly computed.	
MRC	AA-9986	Convert to LDA option would generate erroneous data when loading some large MRC files. This has been fixed.	
	AA-9979	Read As External Data option is now supported for reading large MRC files.	
Multi-Channel	AA-16264	Using several Volume Rendering modules to display the channels of a Multi- Channel field could produce an erroneous display. This has been fixed.	
Multiplanar Viewer (Amira Software only)	AA-21030	Taking a snapshot in the Multiplanar Viewer workroom would make the 3D viewer content disappear. This has been fixed.	
Non-Local Means Filter	AA-19985	On machines with multiple GPUs, the Non-Local Means Filters module would list all available CUDA devices, but the computation would always run on the first listed GPU, no matter the device selected. The selected CUDA device is now correctly taken into account.	
	AA-20713	The Non-Local Means Filter parameters interpretation has been modified from 6.7/9.7 version. See <u>Compatibility notes</u> for parameters conversion.	
Pore Network Model View	AA-14663	When trying to display a small Pore Network Model's data, visualization issues could occur when moving the camera. This has been fixed.	
Process Time Series	AA-20266	It is now possible to the use Process Time Series module to produce time series of the following types: Surface, Spatial Graph, Spreadsheet, Tetra Grid, Hexa Grid, Image analysis, Label Analysis and Multi-Channel data.	
REK	AA-20853	REK reader has been fixed to support 32-bit REK files.	
Surface View	AA-13201	The transparent Draw Style has been fixed for Surface View display on Mac.	
Tcl	AA-14674	"-version" command line has been fixed to return the product version without error.	
	AA-15255	The Tcl command "saveProjectAs -packAndGo filename" now supports all available save policies.	

We are focused on solving as many issues as possible to make your experience with Amira-Avizo Software as satisfactory as possible. We would appreciate your feedback regarding this version. If you encounter problems, or if you have suggestions for improvements, please report them to <u>FRBOR.3d hotline@thermofisher.com</u>.