

Amira-Avizo Software

3D visualization and analysis software

Visualize, Analyze, Understand

Release notes – Amira-Avizo Software 2019.1

March 2019

This document will inform you of 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 FRBOR.3d_hotline@thermofisher.com.

Thank you in advance for your cooperation.

Table of Content

New version numbering scheme.....	3
Avizo Software - Amira XImagePAQ extension: Enhancements and new features.....	3
Image Volume Processing	3
New modules	4
Image Analysis: new measurements	6
Enhancements.....	8
Avizo Inline framework and Avizo Software for Industrial Inspection	8
Enhancements.....	8
Future deprecations.....	10
Compatibility notes	11
Operating systems.....	11
Solved issues	11

New version numbering scheme

This new release introduces a new version numbering scheme unified between Avizo Software, Amira Software and PerGeos Software in order to simplify and clarify versions. The next versions after the previous releases of Amira Software 6.7, Avizo Software 9.7 and PerGeos software 1.8 are Amira Software 2019.1, Avizo Software 2019.1 and PerGeos Software 2019.1, where 2019 represents the year of the release and 1 the number of the release in the year.

All products now benefit from quarterly releases, constantly keeping all users at the best level of features and performance for increased productivity.

Avizo Software - Amira XImagePAQ extension: Enhancements and new features

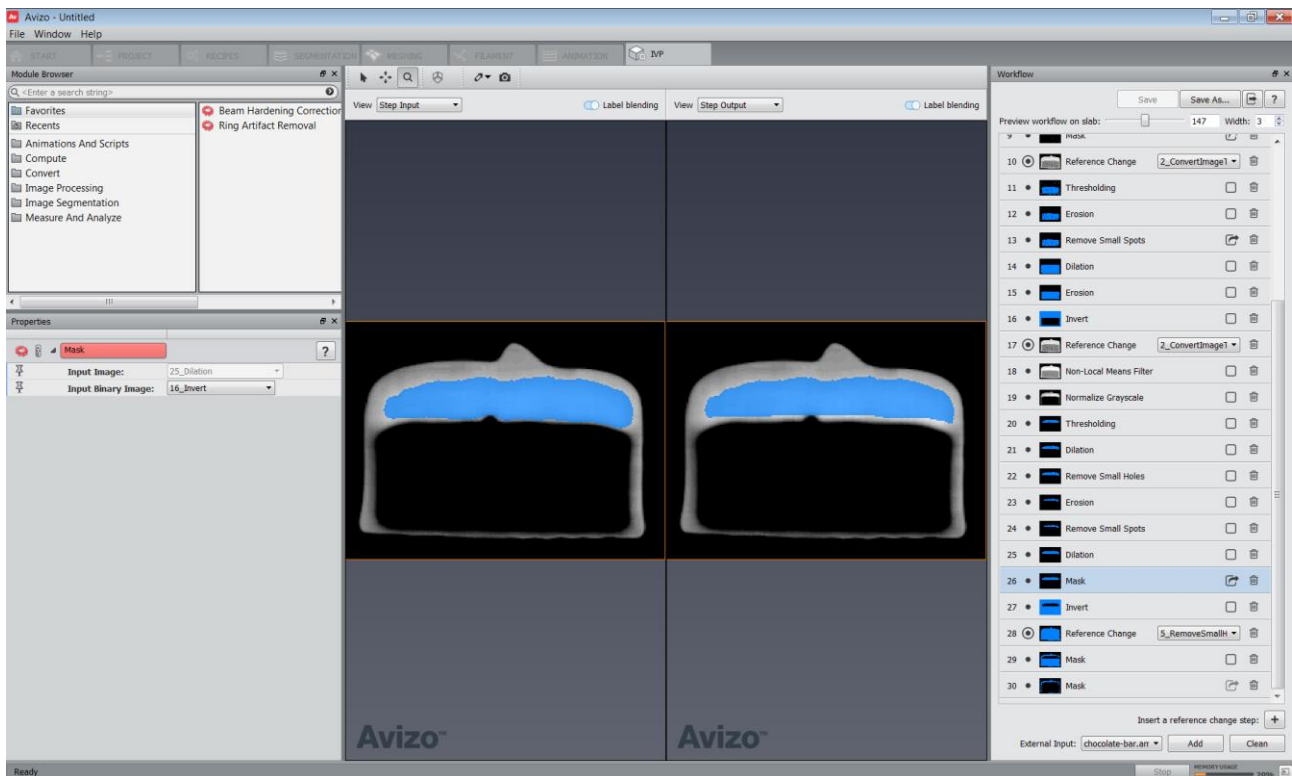
IMAGE VOLUME PROCESSING

In Amira Software 6.7 and Avizo Software 9.7, the Image Stack Processing module was one of the major new features. It allows for the creation and execution of image processing recipes* to process an image stack in 2D. (Each image of the stack is processed individually.)

* A recipe automates the execution of a series of modules to reapply it on any compatible data.

In this release, the Image Volume Processing module is the 3D equivalent to the Image Processing Module. The module enables the processing of an image in 3D rather than processing each image of the stack individually. The creation of the recipe works exactly the same, with only one major difference: the preview is done on a slab (with a user-defined width) rather than on a slice. This allows correct 3D parameters settings.

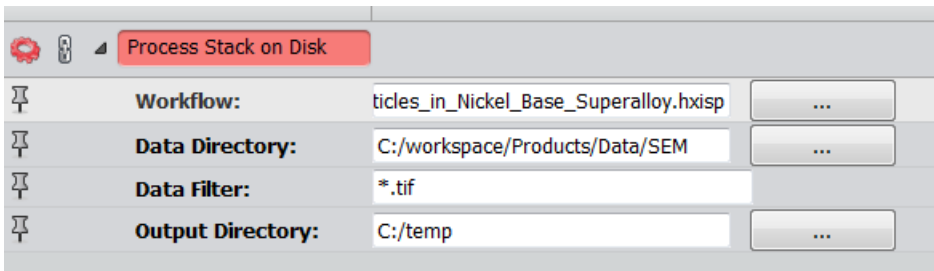
In both the image stack processing and the image volume processing workroom, a thumbnail image is now available to better differentiate the various steps of the workflow.



NEW MODULES

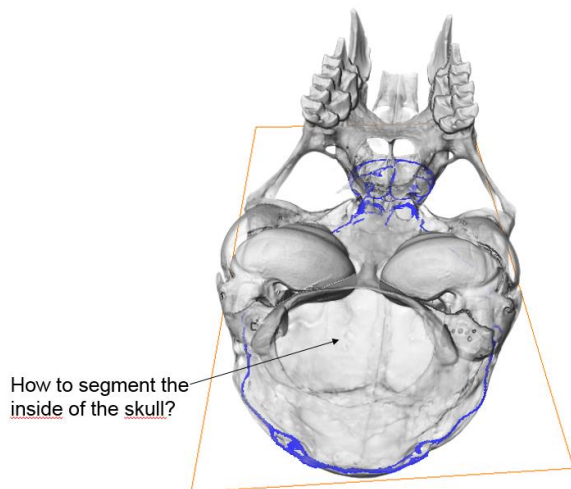
PROCESS STACK ON DISK

While the Image Stack Processing module allows the creation of a workflow from a single slice, it still needs to have the full stack in memory to process it. The new Process Stack on Disk module enables the processing of a full stack directly on disk. Each image in the stack is loaded into memory, processed with the HXISP file and saved on disk. At any given time during the processing, only the workflow to process a given image is in memory. This allows for the processing of extremely large image stack that could not even fit in memory.

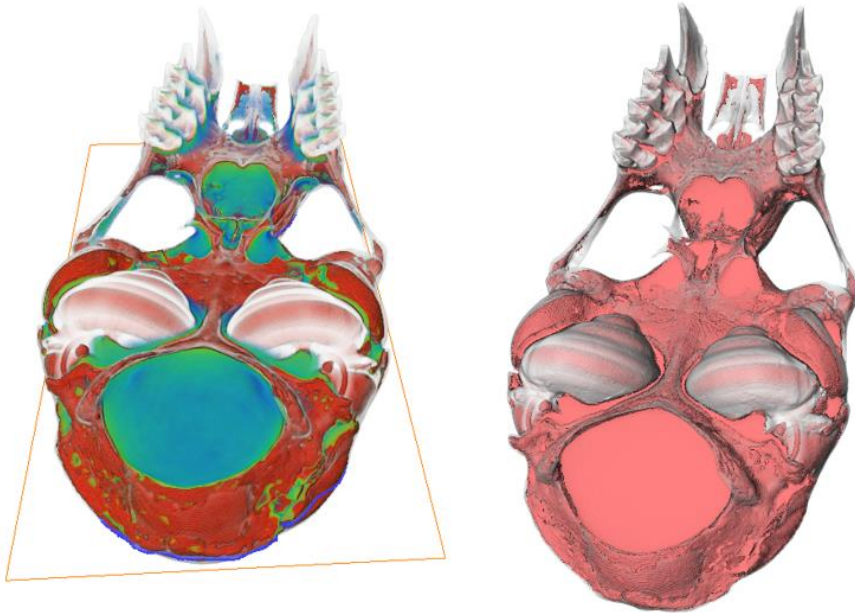


COMPUTE AMBIENT OCCLUSION

This new module enables the segmentation of pores and cavities, which usually cannot be distinguished from the surrounding material, by considering the gray values and texture properties of the image. This tool is a major feature, unlocking workflows that were not previously possible.



The Compute Ambient Occlusion module enables the computation of an ambient occlusion scalar field from a given label field. The ambient occlusion field is computed by casting rays from each background voxel into all directions until the rays hit the foreground. The ratio of the number of rays that hit the foreground to the overall number of rays defines the ambient occlusion value. A value of 0 means that the full light reaches this point, while a value of 1 means that no light at all reaches this point.



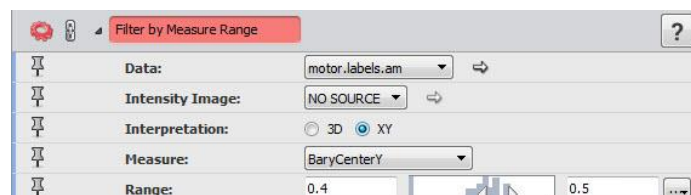
The left image represents the scalar field computed by the module. The right image is the mask computed from a direct threshold of the ambient occlusion scalar field.

Data Courtesy of David Jacobs, SARCHI, Animal Evolution & Systematics – Department of Science and Technology SA

FILTER BY MEASURE RANGE

The Filter by Measure Range module extracts a subset of labels from a label image by computing a measure for each label, then keeping only the labels within a given range of the measure.

For example, by selecting the range [0.4 - 0.5] for the measure BaryCenterY, the label image is filtered, keeping only the labels in the corresponding range.



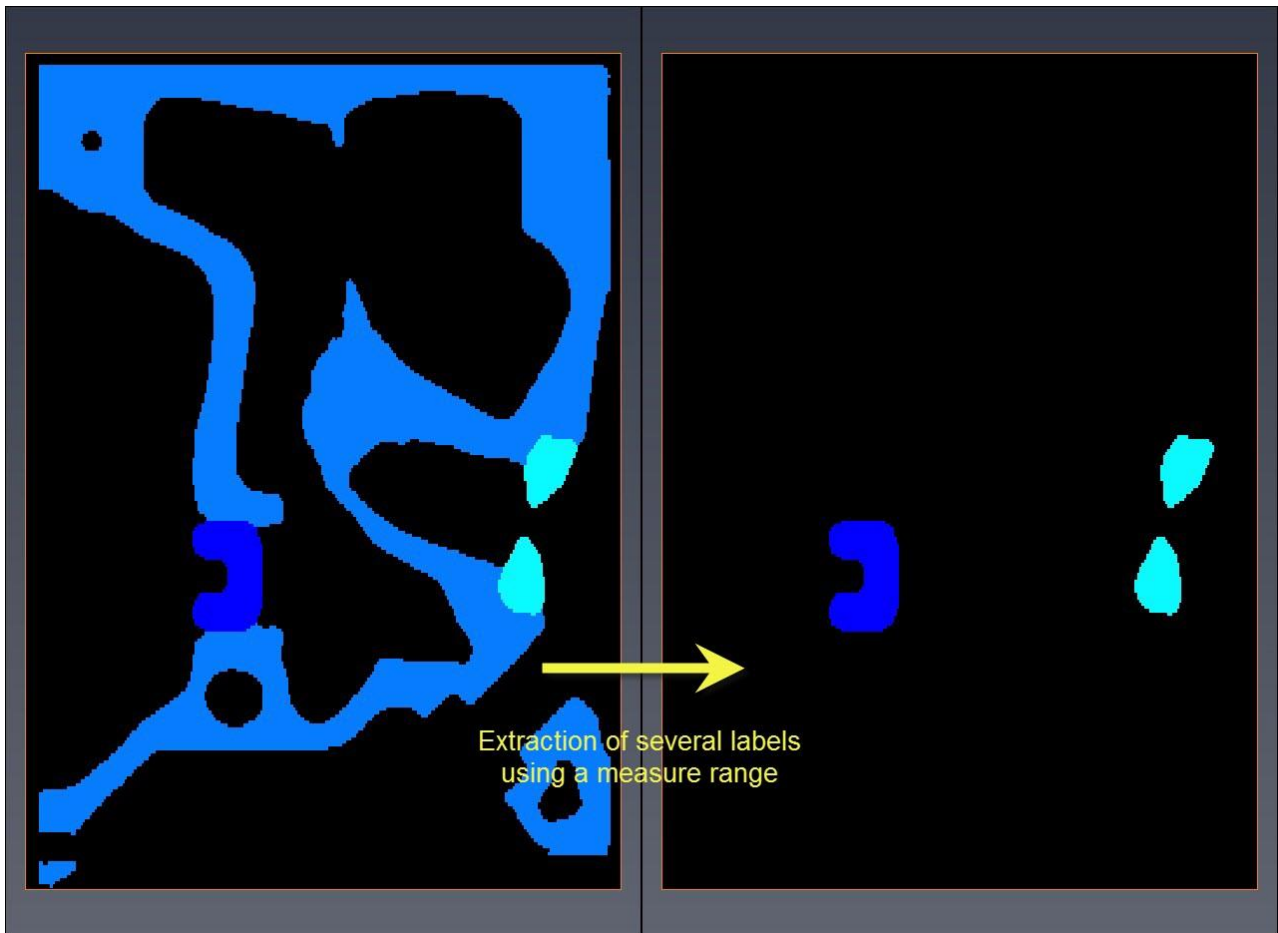
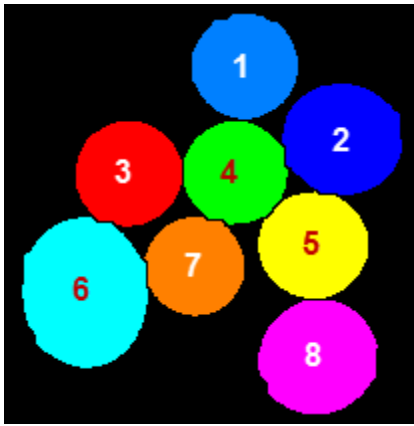


IMAGE ANALYSIS: NEW MEASUREMENTS

NEIGHBOR COUNT

The new [NeighborCount](#) measurement returns the number of objects close to the current label. This measurement is useful for identifying particles belonging to a cluster. It has three attributes:

- Distance unit indicates if the cut-off distance is expressed in pixels (0) or in spatial unit (1). Default value is 0.
- Cut-off distance represents the distance to the current label boundaries where neighbors are searched. Default value is 5.
- Minimal overlap indicates the minimal percentage that should represent the volume overlapping the searched area to be counted as neighbor or not. Default value is 0, which means any neighbor having at least one voxel in the searched area is retained.



Input label image

	NeighborCount
1	1
2	2
3	2
4	5
5	3
6	2
7	2
8	1

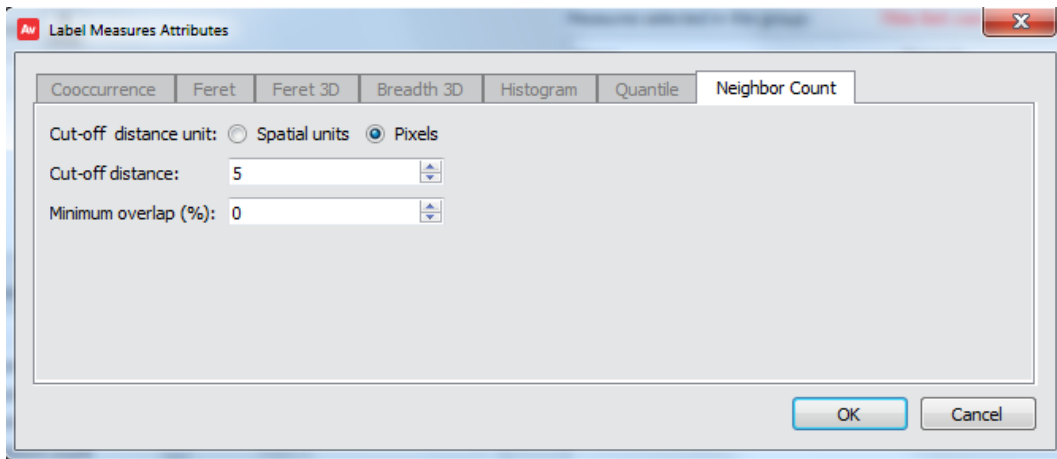
NeighborCount results with default parameters (distance = 5 pixels, overlap = 0%)

	NeighborCount
1	2
2	3
3	3
4	5
5	4
6	2
7	4
8	1

NeighborCount results with distance = 10 pixels, overlap = 0%

	NeighborCount
1	1
2	2
3	2
4	4
5	1
6	1
7	1
8	0

NeighborCount results with distance = 10 pixels, overlap = 5%

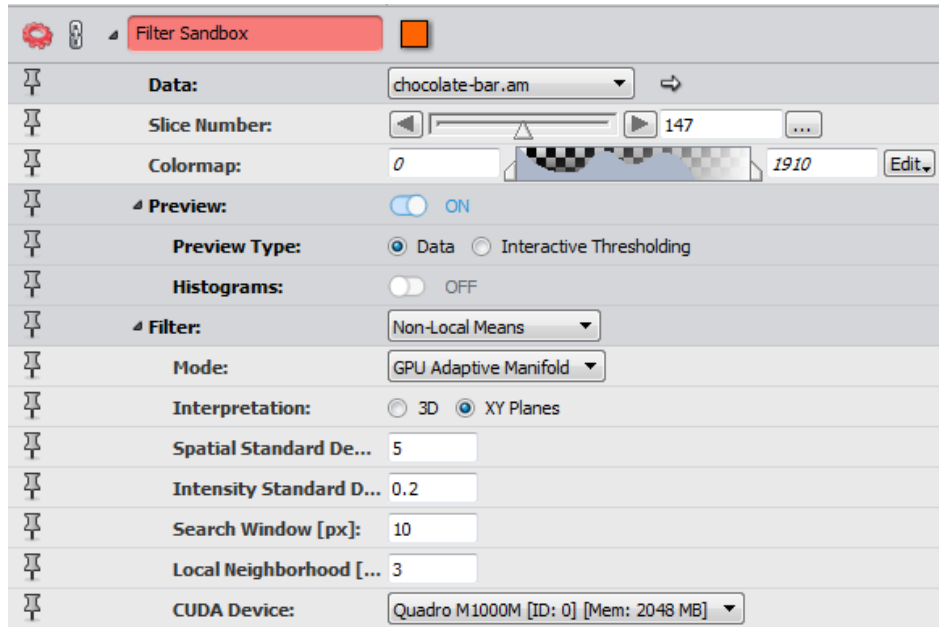


ENHANCEMENTS

FILTER SANDBOX

The Filter Sandbox module now integrates the GPU Adaptive Manifold mode for the Non-local Means filter, with a huge performance improvement, especially in 3D mode.

The ergonomics of this module has been completely revamped to expose for each filter the same parametrization as the corresponding image filter module.

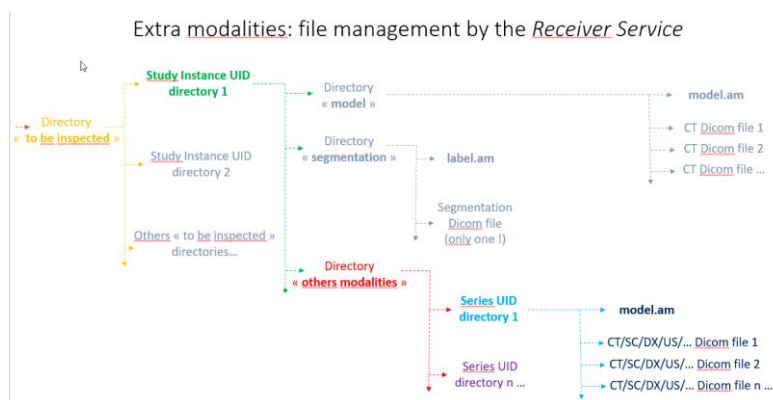


Projects saved prior to this version that contain a Filter Sandbox will be reloaded in this version, but the old Filter Sandbox will be created. The new one (with GPU Adaptive Manifold) must be used and replaced manually.

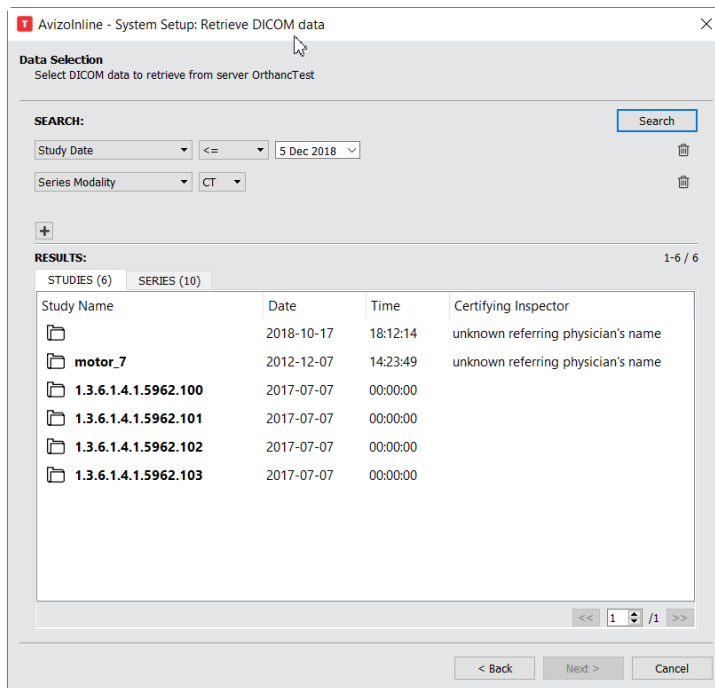
Avizo Inline framework and Avizo Software for Industrial Inspection

ENHANCEMENTS

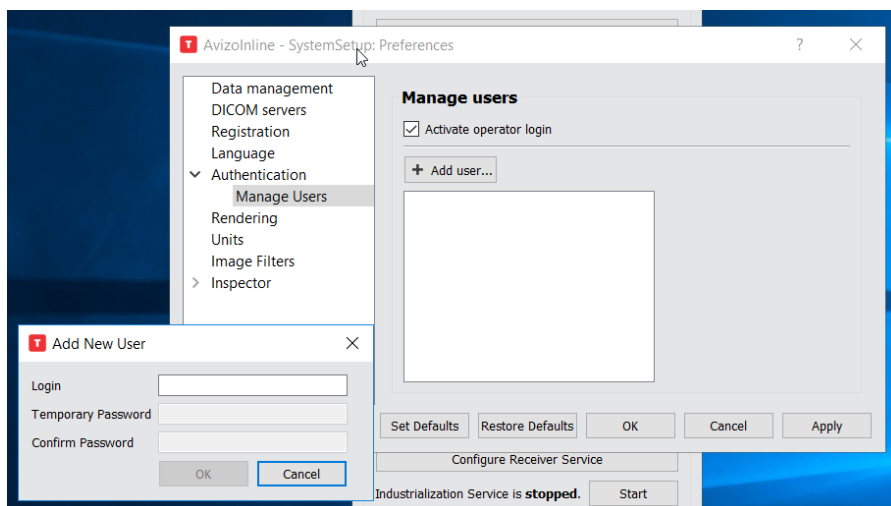
- Avizo Inline adds support for extra DICOM/DICONDE modalities in the receiver service organizing the folder of to-be-inspected models this way:



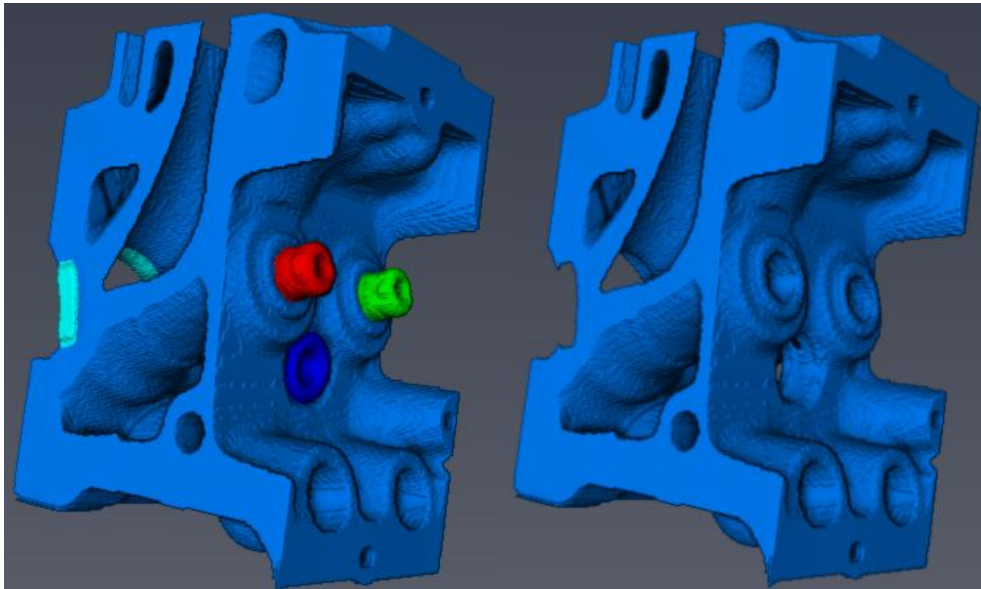
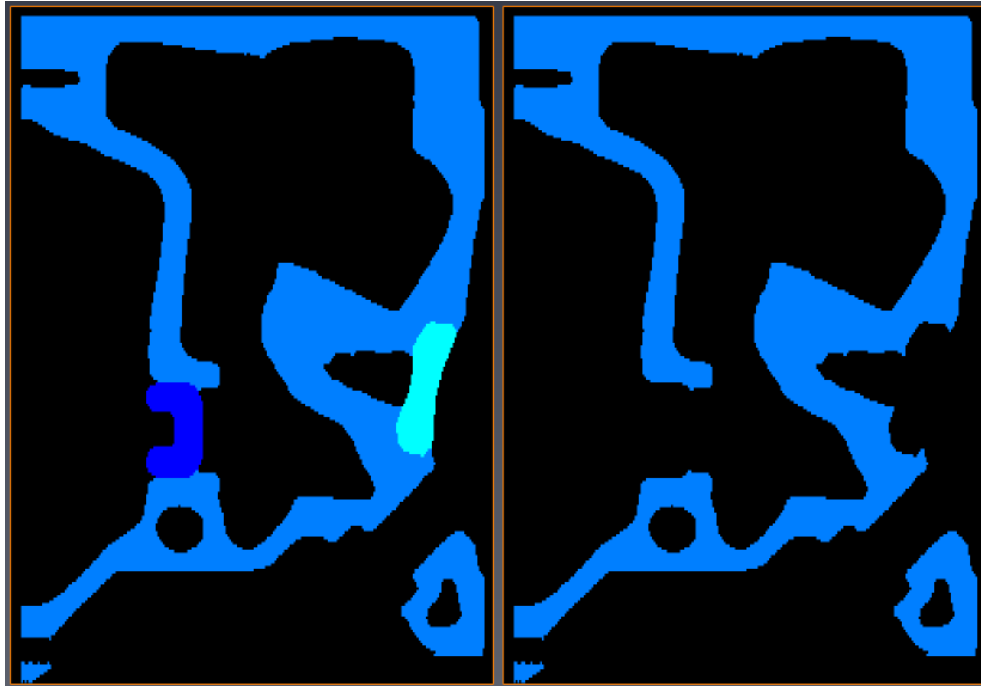
- Avizo Inline also enables the user to configure the DICOM/DICONDE server to be used in the inline process. It allows users to select/filter data to push toward the Inline receiver by using queries based on multiple user-selectable DICOM tags values.



- Avizo Inline provides system administrators a way to set up a set of common preferences shared between all application users.
- Avizo Inline allows site installation administrators to define password protected users. The file AvizoInlineSystemSetup.exe provides the UI needed to define user passwords. Only allowed users can interact with the Inline applications suite as they are identified on applications startup.



- Avizo Software for Industrial Inspection provides support for reading Dicom segmentation object files. If a set of Dicom files contains multiple segmentation objects, Avizo Software for Industrial Inspection can read them properly by loading all the Dicom files simultaneously. The legacy loading behavior is kept by loading just the first Dicom image of the set so that the classic stack break criteria will be used.



New support for Dicom segmentation

Legacy reading of the same “Dicom stack”

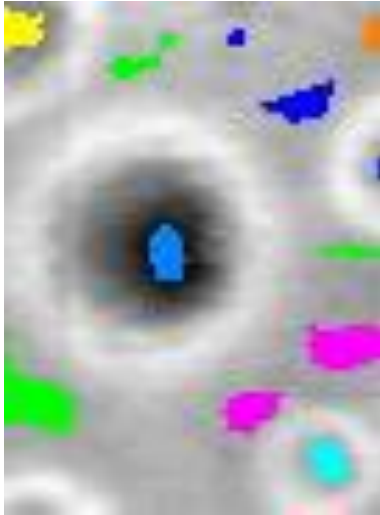
Future deprecations

This section documents the features that will be deprecated or removed from the next Amira-Avizo Software version.

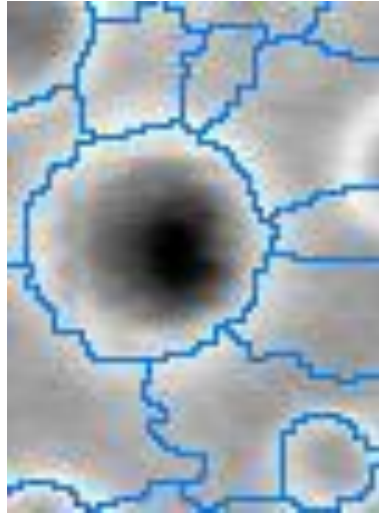
- In Avizo Software 9.2 – Amira Software 6.2 versions, the properties area had been redesigned and many module ports had been modified. Projects created prior to Avizo Software 9.2 – Amira Software 6.2 using modified ports could still be loaded in the next versions, raising warnings about the deprecated ports in the application console. From 2019.2 version, those deprecated ports will be removed. If you are still using projects saved prior to Avizo Software 9.2 / Amira Software 6.2 that are raising deprecated ports warnings, reload those projects then save them in the current version to make them compatible with 2019.2 version.

Compatibility notes

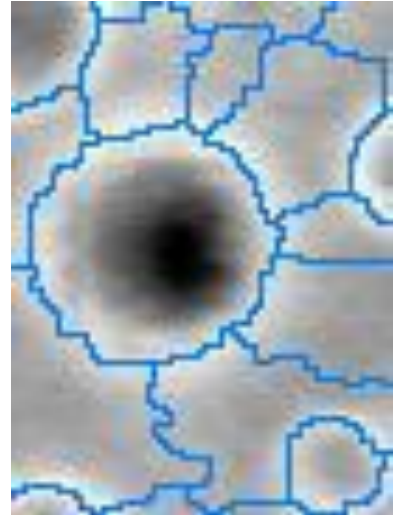
- The default behavior of the watershed algorithm has been changed to consider markers located on the image bounding box. Consequently, the results of the following modules will change when using markers being made up only of pixels on image borders: **Marker-Based Watershed**, **Separate Objects**, **H-Extrema Watershed**, **Watershed Segmentation**.



Input image and markers



Former watershed result



New watershed result

- XGreen extension is no longer supported.
- gcc 4.4.x and Red Hat Enterprise Linux 6 are no longer supported. Supported Linux distribution is Red Hat Enterprise Linux 7 with gcc 4.8.x.

Operating systems

Amira-Avizo Software 2019.1 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 Sierra (10.12) and macOS High Sierra (10.13)

Avizo Software 2019.1 for Industrial Inspection and Inline Extension run on:

- Microsoft Windows 7/8/10 (64-bit)

In order to add custom extensions with Amira-Avizo XPand, 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

Amira-Avizo Software 2019.1 release provides various enhancements and solutions to known problems, including:

Animation Director	AA-11738	The animation director can now handle many events (more than 1,000).
Align Slices	AA-12688	It is now possible to use a mask during the alignment process.
Bio-Formats	AA-15059	Bio-Formats library has been updated and supports additional file formats, including: CZI, ND2, NRRD, OIR and GPTIFF. For a list of all supported file formats and additional information, please visit: https://docs.openmicroscopy.org/bio-formats/5.8.2/supported-formats.html .
	AA-17899	
	AA-17901	
	AA-20609	
	AA-17371	
	AA-11826	
	AA-11090	
	AA-11046	
Filter Sandbox	AA-10656	In the Filter Sandbox module, when using the Anisotropic Diffusion Filter, the initialization of the Diffusion Stop Threshold parameter has been improved.
Line Set Editor	AA-14191	The documentation has been improved with the description of the shortcut keys for selection.
Scripting	AA-14700	On Mac, running the "open -a" command in a shell would only work once in the same application session; this has been fixed.
	AA-14202	Tcl "create" command could generate error messages in the console for some modules. This has been fixed.
	AA-14676	The application can be configured to listen to a predefined port 7175 to accept commands from an external terminal or shell window. On Mac, it was necessary to add the host name to send commands; now, if the hostname is empty, the localhost is used by default.
Segmentation Editor	AA-19967	Performance of Remove Islands tool has been restored.
	AA-16721	The maximum number of materials that can be handled in the segmentation editor is 256. A warning message is now displayed when this limit is exceeded.
Stereo	AA-14622	Using 2 Volume rendering in Red/Cyan stereo mode could generate an incorrect output. This has been fixed.
Subscription licensing	AA-13307	When using Avizo Software full edition features in Avizo Software Lite, the number of tokens required was higher than when using the same features in Avizo Software full edition. This has been fixed.
	AA-16880	
ZVI file format	AA-12917	ZVI files can be loaded with Bio-formats.

Our team is focused on solving as many issues as possible to make your experience using 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 improvement, please report them to FRBOR.3d_hotline@thermofisher.com.