

INTRODUCTION

Release Notes Avizo 7.0.0

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This document describes the improvements and new features in version 7.0 of Avizo, the 3D visualization Software for Scientific and Industrial data.

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OVERVIEW

Avizo 7 is a major evolution of the Avizo product family including many enhancements of the user interface, more flexibility, simplified workflows and even more advanced algorithms.

NEW PRODUCT IN AVIZO FAMILY: AVIZO XLAB EXTENSION

XLab Hydro

XLab Hydro is a new extension of Avizo Fire software, which provides numerical simulation capabilities to calculate absolute permeability of a porous media, from a scanned sample (CT, FIB/SEM, MRI, etc.). XLab Hydro directly computes material properties from the segmented 3D image. The Stokes equations are solved using a finite volume method, with no need to extract a 3D mesh (for Finite Element simulation) or a geometric skeleton (for Pore Network Modeling).

Two new modules are provided:

- **Absolute Permeability Experiment Simulation**
Simulation of an experiment, by hermetically closing a given sample on four faces while experimental setups are added on two opposite faces to guide the flow along one direction;
- **Absolute Permeability Tensor Calculation**
Calculation of the intrinsic permeability tensor, by imposing periodic boundary conditions on a representative elementary volume.

The studied material must be composed of two parts: an impermeable solid phase and a void space in which an incompressible single phase fluid flows.

See Avizo XLab User's Guide for more information.

See also below in this document improvements and new features for specific Avizo Editions.

NEW MODULE NAMES AND MENUS, TERMINOLOGY CHANGES, SCRIPT COMPATIBILITY

New module names and menus

One of the major changes in this release making learning and use of Avizo easier is the renaming of a number of Avizo modules. New names have been introduced for easier reading and understanding.

Modules categories and menus have also been reorganized in order to find more quickly the needed features.

Avizo users will find in the Avizo user's guide index tables for retrieving modules and menus based on former names. The tooltip displayed when holding the mouse over a module will remind the former module name if it differs more than only whitespaces.

In this document the new and former module names are indicated as follows: New Name (*FormerName*).

New terminology: Avizo projects

In order to avoid mix-up and make Avizo concepts easier to understand, the set of active data objects and connected modules is now preferably called Project instead of "object pool" or "module network". Therefore menus such as "Save Network" have been replaced by "Save Project".

The "Pool" component is now called Project Graph View, and "Explorer" is called Project Tree View. Project View refers to both representations.

In Avizo XPand programming interface, the project is still referred as the *network* or *module network*, or the *object pool*. The *pool* also refers to Avizo Project View, more specifically the Project graph View.

Console commands and scripting compatibility

Note that this section is only relevant for Avizo users using TCL commands or creating scripts.

Many module names now contain whitespaces for easier reading in Avizo user interface and scripts. This has some impact on script commands. The module names which contain whitespaces can be written as follow in TCL commands and scripts:

- "The Module"
- The\ Module
- {The Module}

In the console, the automatic completion upon pressing TAB key will insert quotation marks.

The compatibility is ensured with unmodified network scripts saved by former versions of Avizo (.hx files). For modified .hx scripts and for .scro scripts modules, some minor changes may be required:

- Scripts that use hardcoded module names may require to be changed.
Module names should be enclosed with quotes, for instance:

OrthoSlice sliceNumber setValue 10 becomes: *"Ortho Slice" sliceNumber setValue 10*

- Instead of using hardcoded module names in script modules, it is highly recommended to store these in variables, for instance:


```
set myOrthoSlice [create HxOrthoSlice]; "$myOrthoSlice" sliceNumber setValue 10
```
- `$this` should be enclosed in quotes, for instance: `"$this" proc constructor { }`
- For adding quotes within quoted strings, use `'\'` escape characters:


```
"$this" myButton setCmd 0  "\"$this\" showHistogram"
```
- Note that TCL variables are not evaluated within curly brackets `{ }`, for instance:


```
create HxOrthoSlice {$variable} should be: create HxOrthoSlice "$variable"
```

The Avizo XPand C++ programming interface is not affected by these changes. Object class names remain unchanged.

NEW FEATURES

New units management

Powerful unit management has been introduced in Avizo 7. Avizo can now handle working units and display units for coordinates and spatial dimensions, which can be specified by user or retrieved from data for some file formats. For more details see Avizo user's guide, chapter "Units in Avizo". Note that Avizo Wind already handled units for physical quantities retrieved from solvers data files.

New enhanced and simplified volume visualization modules replacing former Voltex, VoltexHighQuality and IsosurfaceRendering

The new Volume Rendering module replaces the Voltex and VoltexHighQuality modules for rendering 3D image stacks. This module is much easier to use than the previous ones. Only useful settings are visible by default and an advanced mode gives the full control of the render settings.

Similarly, the new Isosurface Rendering module replaces IsosurfaceRender for fast rendering of isosurfaces without actual geometric computation.

A new Volume Rendering Settings module presents common settings used by VolumeRender and IsosurfaceRender. This module holds the actual input connection to data.

Multiple Isosurface Rendering modules with different isovalues and colors can be attached to the same data, associated to a unique Volume Rendering Settings. However it is not possible to attach multiple Volume Rendering modules to the same data, as it was possible with former modules Voltex and VoltexHighQuality. As an alternative, you can create a *Multi-Channel Field* object (menu *Create*) to group multiple graylevel images of same size, possibly copies of the same data. Then the Volume Rendering module allows selecting and combining the different channels for display.

You can attach to Volume Rendering Settings a module ROI Box for Volume Rendering, allowing flexible clipping combinations such as "corner cuts".

Volume Rendering and Isosurface Rendering can now be picked in the 3D viewer, for instance after selecting a data probing module such as Point Probe and clicking on volume with middle mouse button, or when using Slice "fit to points" option, or for selecting the display module by picking (new feature described below in this document). The picked point is set on the first non-transparent voxel.

Note that, therefore, you cannot anymore pick or drag other objects such as OrthoSlice through volume as it was possible with VoltexHighQuality. For this you can just select the display module and toggle off the new "pickable" button in the editors region of the properties area (see below "New display module option for picking").

Note: The modules Voltex, VoltexHighQuality, IsosurfaceRender and LDMExpertSettings are now deprecated and no more exposed in modules menus. However these modules can still be created by scripts for compatibility.

New Rendering Quality preferences

New options are added in Preferences Rendering tab:

- It is now possible to activate high precision frame buffer for rendering, which can dramatically improve volume rendering quality, in particular for large semi-transparent volumes.
- An interactive rendering option has been added to activate simplified rendering while interacting in various places such as Volume Rendering and Isosurface modules.

New module Extract Image

The new Extract Image menu replaces the createImage TCL command available for planar modules such as Ortho Slice, Slice (*ObliqueSlice*, *FilteredObliqueSlice*), Curved Slice, Cylinder Slice and Image Ortho Projections (*ProjectionView*). It creates image data from the currently displayed slice.

Point Probe callouts

Point Probe module now supports customizable callouts.

Note that new extended measure tools are now available in Avizo Fire Edition. See below in this document "*New Measurement tools and module*".

New module Split Volume

The new module Split Volume splits a mosaic (2D tiled images within a single slice) into a 3D image stack or multi-stacked volume into separate stacks.

New module Convex Hull

This module Convex Hull allows you to compute an approximation of the convex hull of arbitrary point sets, line sets, surfaces or grids. The computed output is given as a triangulated surface.

Support for JPEG 2000 image files

JPEG 2000 image files are now supported for both input and output.

USER INTERFACE ENHANCEMENTS

Dockable windows, new toolbar and windows layout

It is now possible to reorganize the Avizo windows layout by moving windows interactively: to detach a panel window drag its tittle bar.

The Project View (Pool) and the Properties areas are now also in independent panels. It is also possible to hide or show these panels by using TCL commands: *theProperties show/hide* and *theProjectView show/hide*

A new toolbar provides a set of buttons for quick access to open, save, preferences, console, colormap editor, etc. The toolbar has buttons for showing/hiding all panels (hotkey Ctrl-F11) or help panel (hotkey Ctrl-F1).

The Stop button is now next the progress and status bar, and is no more part of the Properties panel. The Close button for the Segmentation Editor is now located next to the Main Panel's top right buttons.

Avizo editions are now distinguished by color symbol in menu bars.

Note that the console is now hidden by default. You can use the top menu Window to show it or you can press the Console button in the toolbar.

More tooltips

Many tooltips providing short descriptions have been added for:

- Ports
- Module names in pop-up menus
- Module in Project View, even when module is not selected
- Editors

Tooltips remind the former names of modules.

New colormap editor

The colormap editor has been redesigned for more convenient use. The new colormap editor user interface has a more compact layout and is dockable as other Avizo windows, so it can be more easily used permanently. A top window toolbar button allows showing or hiding the colormap editor. The colormap editor automatically selects the colormap depending on the selected data and display module. The opacity curve (alpha curve) is displayed overlaid on top the data histogram. You can translate easily opacity curve segments and set predefined curves. Color keys are now edited with the standard Avizo color editor, and saved to colormap files with exact matching data values. Two-side color keys can be defined for 'step' interpolation.

All colormaps available from Avizo installation directory can now be accessed directly from the colormap editor. You can still load other colormaps in Avizo by the main menu File > Open Data.

New Load File dialog

The dialog used for opening and saving files are now implemented using native file dialogs. This allows you to benefit from all the system specific enhancements provided by the operating system.

For overriding automatic format recognition, use the new item in main menu File > Open Data As...

After selecting the file(s) to load, the Format selection dialog is displayed.

Project View (*Pool*) enhancements – reorder icons, colormaps visibility, icon colors

When working on a project with a large number of objects or when resizing windows, it is sometimes necessary to reorganize the icons displayed in the Project View (pool area). A new tool accessible in toolbar does it automatically.

Colormaps connected to modules are now hidden by default to avoid confusing the project view. You can enable the option "Show colormaps connected to objects" from menu View>Preferences, in Layout tab, Project View box.

The color of some icons has been lightened to enhance readability. Module icon color can be modified by using TCL option `-color` in the module type resource description.

New display module option for picking

When working on complex project where several modules can be tuned interactively by clicking on the 3D view such as Ortho Slice, one could inadvertently make an unwanted change.

Each display module has now a new toggle button, in the editor region of the properties area, to make the module pickable or unpickable (locked for interaction in 3D viewer). Furthermore, the Project menu contains two new entries to make all display modules pickable or unpickable at once.

Select a module from 3d view

A new viewer tool allows you to select a module in the Project View by just picking on a visual representation in the 3D view. This is useful when several modules of the same type are displayed to select the right one.

User interface for port connection

The port connection mechanism, allowing connecting two ports so that when one is edited, the other is updated accordingly, was available only from the TCL scripting. This can now be done interactively:

- Once a module is selected, click on its Connection Editor (large chain link icon) in the properties area to show connection buttons (smaller chain link icons) next to ports pin buttons.
- Click on a connection button and drag it on top of a module containing same port to connect to. You can also connect with another port of same type in the properties area.
- Right-click on a connection button to select the connected module or to disconnect the port.

Note: corresponding TCL commands are now *interconnect* (formerly *connect*) and *disconnect*

Synchronize module's ports

The new Synchronize Ports module can be used to synchronize at once all ports of two modules connected to its inputs. In order to use the module, select the first module to be synchronized. Then choose Animate>Synchronize Ports from the popup menu.

Control object visibility per viewer

A new toggle button "Link objects visibility" has been added to viewer's toolbar. When this toggle is on, changing visibility of an object will apply at once to all opened viewers.

New convenience options have been added in viewer's popup menu to control the visibility of display modules:

- Display the same objects in the extra viewer (viewer id 4),
- Hide all objects for the viewer,
- Show all objects for the viewer,
- Link the visibility of objects across all viewers (i.e. from viewer ids 0 to 5),
- Copy the visibility status of objects from one viewer to another,
- Display the viewer identifier in the viewer,
- Display the viewer identifiers in all viewers.

Data Info tags enhanced

Data information tags can now be pinned in properties panel.

The displayed information has been clarified for image data types. Information on optional data window and range calibration (Avizo Fire edition only) is now also displayed.

New range slider port user interface

Range ports such as Ortho Slice's Data Window now allow dragging directly the range interval or boundaries.

Note that Avizo Fire Edition can in addition display the data histogram in slider background. See below in this document "*Slider histogram*".

Surface Editor's user interface clarified

The selector tool of the surface editor has been enhanced for more clear usage. Test results are now displayed in the viewer in addition to the console.

Height Map Field (*HeighField*) default draw style and scale changed

For quicker display, the default draw style for Height Field Map module is now *shaded* instead of *outline*. The default scale is now -0.05 and port min/max allows negative and positive scales.

FILE FORMATS ENHANCEMENTS

New NSI reader

A new reader for North Star Imaging data files has been added.

Improved Large Data Access (LDA) support for RGBA color data

The LDA format conversion and support modules such as Extract Subvolume (*LatticeAccess*) have been improved for support of RGBA color data.

DICOM import improvement

The DICOM reader does not anymore predefine a *DataWindow* parameter for the loaded data and an arbitrary default linear data mapping for the attached display modules.

DataWindow was previously set to range [-200;200].

The DICOM reader has been extended to support more format variations.

Note that Anonymize Image Stack module is now visible only when the dataset contains DICOM parameters.

Improved support of Olympus OIB file format

Olympus (oib/oif) reader fixes several issues regarding version 2 of the file format.

Export to Open Inventor compressed format

It is now possible to save Open Inventor data as binary compressed format using the Open Inventor 8.x file format.

NOTE: Avizo now exports Open Inventor format version 8.6.

New Avizo data file format

Avizo's native data files are now identified as such and use a new header format (# Avizo ...), superseding the former name AmiraMesh for container format. Avizo is however still compatible with the same data files as its previous versions: Avizo can write data files using Avizo 6 file format, and can read the same AmiraMesh data files as the previous Avizo version.

Extended support for international characters in file paths (e.g. Chinese or Japanese)

File paths with international characters are now supported for the following formats: IGES, STEP; Avizo native format for images, grids and surfaces; DICOM, RAW and TIFF. Other file formats may still not be supported for international file paths.

OTHER ENHANCEMENTS

Enhanced MATLAB integration

The connection to the MATLAB server has been improved. The Calculus MATLAB module can now transfer surfaces, surface fields, and line sets between Avizo and MATLAB through struct arrays. Lattice data - such as images or regular scalar fields - can now also be passed as struct arrays, enabling access to information such as bounding box (i.e. voxel size).

You can now even attach any type of module as input to Calculus MATLAB. The module's ports will be sent over to MATLAB and made available in a struct array named after the input module. This provides a way to transmit information like text strings or parameters from Avizo to MATLAB.

Also, Calculus MATLAB can now be accessed directly from the Create menu and therefore does not require to be attached to a field anymore.

New tutorial examples using MATLAB have been added: core line detection, conversion from RGB to CIE Lab color space, and image denoising.

Enhanced Spreadsheet support

A new module Spreadsheet Filter allows filtering a spreadsheet by the data values of up to four user defined columns. Filtering can be performed by setting an upper and lower threshold or by an arithmetic expression.

Rows can now be added or removed dynamically in spreadsheets.

The module Plot Spreadsheet can now display a marker line. The marker line position is controlled by a time input port that can be connected to another module with time port for synchronization.

This replaces the deprecated module Time History Plot that can be still created by script for compatibility.

Save project (module network) from TCL script

The new TCL commands *saveProject* and *saveProjectAs* can be used to save a *project* (module network) from a TCL script.

Vertex View

If this module is connected to a line set, a new port allows selecting a line set's data field for coloring.

A new DrawStyle option *Haze* has been added which enables a star-like effect.

Stream LIC Surface (*SurfaceLIC*)

The Stream LIC Surface module has now the possibility to use two color fields. This second optional scalar field adds the option to colorize the LIC with the two fields multiplied.

Scalebars (*Scale*)

The Scalebars (*Create > Scale*) display module has two new options to set the line width of scale bars and the font size of graduation.

Display Time and Display Time new Font port

A new port is available for changing font name and size for Display Time and Display Date modules.

Enhanced Surface Patch Contours (*DisplayContour*)

The Surface Patch Contours (*DisplayContours*) module has been extended in order to choose contours according to their bordering materials.

Isocontour Slice (*Isolines*): new port Quality

A new port has been added to control the sampling used by Isocontours Slice.

Probing and Arithmetic on external data

Probing tools and Arithmetic modules are now working on external data (read as External Disk Data).

Enhanced Surface Cross Section (*SurfaceCut*)

The Surface Cross Section (*SurfaceCut*) module can now use a constant color for rendering materials.

Color Wash color blending

The Color Wash module has a new fusion method Label Blending to blend the label colors. It uses alpha blending to blend in each voxel of the attached label field, colored by its material color as specified in the bundle parameter.

Slice module (*ObliqueSlice*, *FilteredObliqueSlice*) enhancements

The Slice module (formerly *FilteredObliqueSlice*) now supersedes *ObliqueSlice*.

New filters have been added: morphological opening and closing filters, Non-Local Means filter.

The Apply buttons and auto-refresh can now be used to control computation of filter. For instance, you can set auto-refresh toggle off to avoid the computation of edge preserving smoothing filter whenever changing one of its parameters. By default auto-refresh is on, expect for the Non-Local Means filter available with Avizo Fire edition.

Clipping Plane (*ArbitraryCut*) enhancement

It is now possible to adjust the plane orientation of a Clipping Plane (*ArbitraryCut*) or a derived module such as Slice (*Oblique Slice*) or Stream LIC Slice (*PlanarLIC*), based on a vertex set attached as input (Point Cluster, Surface, etc.).

Curved Slice extension

ROI planes can now restrict data extraction between two planes orthogonal to the slice direction.

Point list edition enhanced in curve editor and data probing modules

The 3D point list port has a new Interactive option to see the shape of the segment being drawn before appending a new point to the curve.

Isosurface downsampling

When *interactive rendering* option is set in Preferences > Rendering, Isosurface is automatically downsampled while moving the slider when auto-refresh is set.

Segmentation Editor enhancements

Note that the Close button for the Segmentation Editor is now a small cross button located next to the Main Panel's top right buttons.

A question mark button has been added at top the of the Segmentation Editor panel for direct access to the related help. Tooltips are also displayed when hovering the mouse over panel buttons.

The default draw style for labels is now *hatched*. You can now change the default draw style for labels in the Preferences>Segmentation tab.

You can now change the *Image* to be segmented at the top of the Segmentation Editor panel.

Multiple label fields can now be used in the segmentation editor. It is now possible to create a new empty *Label field* to be edited, to delete the currently edited *Label field*, or to choose a *Label field* to be used from within the segmentation editor.

New buttons for morphological erosion and dilation have been added beside selection tools.

New buttons for adding, removing or locating materials have been added next to materials list.

For convenience, thresholding is now available in Tool's toolbar instead of Selection menu.

The brush tool is now more responsive when quickly moving it.

It is now possible to change the upper bound of the size slider of the brush tool. This can be used to select discs of arbitrary size.

TCL commands have been added:

- *lockMaterial*: to lock the current material
- *isMaterialLocked*: to inquire if the current material is locked
- *newMaterial*: to create a new material
- *renameMaterial*: to rename the current material.

See also below in Avizo Fire Edition other important enhancements in the segmentation editor.

Snapshot tool

It is now possible to capture all viewers in a snapshot.

You can also configure printer when choosing printer output for snapshot.

The snapshot tool now allows exporting images in pdf format.

TCL upgrade

Avizo now uses TCL 8.5.

Open Inventor upgrade

Avizo now uses Open Inventor 8.6.2 as graphics engine.

PERFORMANCE IMPROVEMENTS

Control of multi core usage

It is now possible to control the maximum number of CPU threads usable by compute modules. By default this value is set to "Automatically choose number of threads". A new Performance tab has been added to the preference editor for this parameter.

However note that multi-core usage by Quantification module in Avizo Fire is still controlled by the command `Quantification:parallelmode`.

Resample

The Resample compute module has been enhanced to take advantage of multi CPU systems. The performance gain is approximately proportional to the number of CPUs available.

Erosion and Dilation

The Erosion and Dilation morphological operators have been enhanced to take advantage of multi CPU systems. The performance gain is approximately proportional to the number of CPUs available.

Segmentation Editor threshold computation and 3D selection

The threshold algorithms and the 3D selection display of the segmentation editor have been enhanced to take advantage of multi CPU systems. The performance gain is approximately proportional to the number of CPUs available.

Faster histogram computation

The histogram computation has been enhanced to take advantage of multi CPU systems. The performance gain is approximately proportional to the number of CPUs available. The histogram computation is used in several Avizo tools like for instance when launching the segmentation editor.

Improved performance of Movie Player

Performances of the Movie Player module have been improved significantly by using recent GPU hardware acceleration when possible.

Improved Large Data Access (LDA) conversion performances

Conversion performance has been improved for stacks of 2D images, in particular for large images.

See also above in this document the improvements and new features common to all Avizo Editions.

NEW FEATURES

New automatic range calibration

When loading 3D image data, the new automatic intensity range calibration tool computes a set of values representing possible threshold between phases in the data set based on a gradient method. The set of values (so called *calibration ranges*) are then directly usable in all modules having a threshold value slider port, or colormap port, such as Isosurface, Ortho Slice, or Volume Rendering.

A new Preferences tab *Range Calibration* allows controlling this feature.

New Ortho Views display module

The new Ortho Views module displays a 3D image data set or, more precisely, a 3D scalar field with either uniform or stacked coordinates, in four views: one full 3D view and 3 side views of the xz, yz and xy planes. This module replaces the former *StandardView* module which was limited to 2D representations in side views. In Ortho Views, any 3D modules can be displayed in all views. Furthermore, from the Ortho Views module, several overlay modules can be attached such as Isocontour Slice (*Isoline*), Surface Cross Section (*SurfaceCut*), or Surface Cross Contour (*Intersect*), to easily overwrite the default representation.

A convenience template menu is available for easy setup of visualization for 3D images (uniform scalar fields, color fields, or LDA on-disk volume data). You can access it from data object menu *Template*. This menu setups range calibration on data if needed, and attaches an Ortho Views module with Calibration View (contours) and a Volume Rendering module.

New Measurement tools and module

The Measurement tools available in viewer window and the associated module have been changed in Avizo Fire edition. The new tools allow snapping of anchor points to high or low image grey or gradient intensities (edges) or nearest points of linesets. The snap area size can be defined by user. Customizable callouts can now be attached to measures. The angle and circle manipulators have been enhanced. The new Measurement module is now fully scriptable.

Note that 2D measures tools previously available are now superseded by 3D measures.

The previous Measurement module - as available in Avizo standard edition – is no more exposed in Avizo Fire edition but can be still created by script for compatibility.

New Porosities Analysis Wizard

The new Porosities Analysis Wizard module is a workflow assistant that allows quickly extracting and quantitatively analysing porosities in a 3D image.

New FIB Stack Wizard

The new FIB Stack Wizard module is a workflow assistant for shear correction, automatic alignment, shading correction and cropping of image stacks coming from FIB/SEM acquisition (Focused Ion Beam / Scanning Electron Microscope).

New morphological Opening and Closing image filter

New morphological filters Opening and Closing have been added to image filter editors.

New Non-Local Means image filter

The new Non-Local Means filter is a very powerful tool for removing noise such as white noise from an image. The non-local means algorithm will naturally preserve most features present in the image, even small and thin ones. This module is accelerated by multi-core or GPU.

Note that in the *Slice* module, the auto-refresh toggle is off by default for the Non-Local Means filter.

New Anisotropic Diffusion image filter

The new Anisotropic Diffusion filter module is a very powerful tool for enhancing noisy or non-uniform images for purpose of segmentation. Similar to the Edge Preserving smoothing filter, this module is accelerated by multi-core or GPU.

Unlike the Edge Preserving filter, the Anisotropic Diffusion filter always applies in 3D mode only and cannot be applied by slice in the current release. It is therefore not available in Slice filters.

Simplified handling of label fields/images

Visilog label images and binary images, as created by modules such as *Quantification*, are now standard Avizo label fields. Avizo label fields can now store 16 and 32 bits labels.

Note however that a number of modules in Avizo 7 will still only accept 8-bits labels.

The segmentation editor can accept 16/32 bits labels if they contain less than 256 labels.

The module Convert Image Type (*CastField*) and a new in-place editor allow converting 16/32 bits labels.

New watershed tool in the segmentation editor

The new watershed tool is a powerful addition to the segmentation editor. This tool allows taking best advantage of Avizo Fire Watershed Algorithm with interactive techniques for effective segmentation of complex 3D structures. It is based on a marker-controlled watershed algorithm which segments a grey level image based on:

- A landscape image, for instance gradient extracted from the dataset.
- A set of markers identifying seed regions, for instance defined from the current selection or by selected materials already segmented.

Region growing threshold in the segmentation editor

Region growing tool of the segmentation editor's magic wand can now be limited to a contrast threshold defined by a slider.

Slider histogram

Slider ports representing a threshold and used for instance in Isosurface, Multi-Thresholding (*LabelVoxel*), Ortho Slice, etc., display now the data histogram in the background. This is useful for identifying representative threshold values.

Thresholding RGB color images with Interactive Thresholding (*Quantification-Threshold*)

The Interactive Thresholding module (*Quantification-Threshold*) can now be attached to color fields and allows defining minimum/maximum thresholds for each of the three RGB channels.

Float slider in Interactive Thresholding (*Quantification-Threshold*)

When working on image containing floats or doubles, the Interactive Thresholding (*Quantification-Threshold*) threshold slider ports now display float values.

Visilog colormaps replaced by standard cyclic colormaps

The specific colormaps used for instance for label images or binary images created by the Quantification module, are now replaced by standard colormaps `labels` and `labelsBinary`. These colormaps use new properties for cyclic colors and for preventing color interpolation across values.

QUANTIFICATION MODULE NEW FEATURES AND ENHANCEMENTS

New image filtering commands in Quantification module

- New adaptive filter command group: `bilateralfilter`, `bilateralfilter3d`, `despecklefilter`, `despecklefilter3d`, `nagaofilter`, `nagmodfilter3d`, `sigmafilter`, `sigmafilter3d`, `snnfilter`, `snnfilter3d` (SNN: Symmetric Nearest Neighbor). These non-stationary filters are used to reduce image noise while preserving maximum contours. Note: see also Avizo Fire Anisotropic Diffusion and Non-Local Mean image filters.
- New commands: `majorityfilter`, `majorityfilter3d`. The majority filter replaces each pixel value by the most present value in its neighborhood.
- New command `gaussianfilter3d`: a 3D Gaussian filter has been added, plus it allows to parameter smoothing factor depending on axis.
- New color filter command: `antialiasing`, a high performance filter for color images, used in demosaicing operations done on the raw images obtained from single-CCD color camera (Bayer filter).
- New commands `linearkernel1`, `linearkernel2` apply a convolution in a specific direction. Applies only in 2D.

New and enhanced global measurements in Quantification module

- New command `statmask` to compute statistics only on the areas described by a binary image.
- New command `distmask` to produce a distance map restrained by forbidden areas defined by a binary image mask.
- `inertia3d` global measure now provides the secondary orientation. For instance in the case of a planar shape, this corresponds to its normal.
- New command `measurefilter` to sort and filter connected components (labels) according to a measurement.

- New command `volumedensity2d`, `volumedensity3d` for creating density images (map of density per volume unit).

New and enhanced individual measurements in Quantification module

- New set of individual 2D measures related to co-occurrence matrices (texture measures)
- New set of individual measures related to histograms of intensities present in the labels
- New `greybarycenterZ` measure: Z coordinate of the weighted center of gravity. Only X and Y were available in previous version.
- Change in `I_filter_image` command: when input is a binary image, output is now a binary image.
- `EqDiameter` measure now applies in 3D
- New individual measure `symmetry` (indicator for shape symmetry) – 2D only.

New and enhanced image processing commands in Quantification module

- New command `auto_threshold_inv` : which corresponds to the sequence of commands `auto_threshold` and `logical_not` but in a single pass
- New command `auto_segment`: similar to `auto_threshold`, but computes 2-level thresholds based on histogram.
- Change in command `hole_fill` on 3D images: it can now directly apply either in 2D (slice by slice) or in 3D
- New command `border_fill`
- New command `I_analyzeseq` : similar to `I_analyze` but processing input as image sequences
- New command `cooccurrence` (Segmentation /Texture group).
- New commands `removemeasurefromgroup`, `removegroup`.
- The command `porosity` can now operate slice by slice on image stacks
- The command `hysteresis` can now apply in 3D
- New command `ridgelineimg` similar to the `ridgeline` command but that generates a binary image as output instead of a segment object.
- Change in `bkgimg`, `shading_cor` and `ridgeline`. The mask image can now be replaced by an empty string when the whole picture must be taken into account (instead of 0).
- New command `rotatecenter` to rotate about the center of the image
- New commands `buildline2d`, `buildline3d` to create binary images with oriented parallel lines
- New command `zoomfactor` to expand the image of a multiplicative factor
- The command `I_tophat` now displays the unmodified input data as background image during interactive thresholding, instead of the result of closing or opening.

Other Quantification module enhancement

A new port *Interpretation* has been added to easily apply commands slice by slices (XY planes) or in all directions at once (3D), when applicable. This supersedes the `seqfrom3d` and `seqto3d` commands.

Tooltips are now displayed when hovering over inputs in the 'pipeline' area of the Quantification module's properties.

PERFORMANCE IMPROVEMENTS

Optimized processing in Quantification module commands

Optimizations enable significant gains on most Quantification commands, both in mono and multi processors and in 2D or 3D. In a number of cases performance gains up to 50% or above have been achieved.

In particular, performance has been improved in a number of cases for Gaussian and median filters commands, and for fastwatershed and derived commands like binseparate or greyscale.

AVIZO WIND EDITION - IMPROVEMENTS AND NEW FEATURES

See also above in this document the improvements and new features common to all Avizo Editions.

NEW FEATURES

New features for time series

The Sequence Controller module now allows extracting separate time steps, without duplicating model data.

New Pathline module

The new Pathline module extracts the path of massless particles inside time-dependent 3D vector fields.

Improved support for mechanical data

Support has been added for mechanical data stored at element nodes, such as stress and strain.

New Tensor Extract compute module

The new Tensor Extract module computes tensor related variables such as the invariants, the eigenvalues, and the eigenvectors. It also computes from the stress tensors the Von Mises and Tresca elasticity limit criteria.

New displacement scale factor

A displacement scale factor has been added to the Sequence Controller in order to magnify or minimize the deformation of the mesh displacement.

New Bar Chart Slice module

A new Bar Chart Slice module displays an extruded plane slice of a scalar field attached to an unstructured mesh model. That is similar to Bar Chart Slice (*CityPlot*) or Height Map Slice (*HeightField*) modules already available for regular scalar fields.

PERFORMANCE IMPROVEMENTS

CFD/CAE file reader improvement

The loading time for most CFD/CAE file formats has been divided by two.

Support of NetCDF4 CF1 and relaxed compliance check

NetCDF 4 CF1 is now supported. Compliance checking has been relaxed to allow importing more of the netCDF files that are not compliant with CF1 standard.

Support of unstructured grid for NetCDF4 file format

NetCDF support has been extended for unstructured meshes: Avizo Green can now support meshes unstructured in XY plane and structured in Z with cells composed of 3, 4 or 6 vertices, considered conformal. A number of representations have been extended for this type of mesh: Cross Section (unprojected in projected space), Vectors Slice (*Vectors*), Isocontour Slice (*IsoLines*), Illuminated Streamlines (*DisplaySL*), Particle PahtLines, Isosurfaces, Embossed Slice (*BumpSlice*), Height Map Slice (*CityPlot*)

AVIZO XPAND

XPand now compatible with Qt LGPL

The XPand extension SDK can now be used with the Qt LGPL version in order to develop extension modules for Avizo. It is no more necessary to use the Qt commercial license for that. Avizo uses Qt-4.7.2.

XPand for Windows and Visual Studio 9

The XPand SDK is now provided for Visual Studio 2008 (VC9).

New XPand examples for CUDA or OpenCL compute modules

New tutorials and examples show how to create Avizo compute modules taking advantage of GPU using CUDA or OpenCL.

XPand header files renamed

XPand include files have been renamed. Amira is replaced by hxcore. A compatibility mode allows existing modules to compile without error.

XPand menus - Programmer's Guide and Reference, Development Wizard, Qt Inspector

XPand API Programmer's Reference can now be accessed from Avizo Help menu, in addition to Programmer's Guide. Do not miss also the Avizo Code Book, located in the "doc" subdirectory of the Avizo installation directory.

The Development Wizard can be accessed from the XPand menu. A new Qt Widget Inspector is also available in this menu.

LIST OF SOLVED ISSUES

Issue#	Title	Release notes
62	Saving an imported file to Avizo unstructured mesh format is not possible	When loading a simulation result such as a Fluent file, it was not possible to save the data as an Avizo model.
274	TimeSeriesControl "interpolate between frames" do not work in some cases	Standard demo Avizo/Time-Dependent Data/ "Argon cluster" did not work when "interpolate between frame" is checked.
318	TimeHistoryPlot should not be in Main menu for spreadsheet objects	AVIZO ALL EDITIONS - OTHER ENHANCEMENTS The module Plot Spreadsheet can now display a marker line. The marker line position is controlled by a time input port that can be connected to another module with time port for synchronization. This replaces the deprecated module Time History Plot that can be still created by script for compatibility.
414	Display modules help page says there is a Colormap port but it does not appear in the user interface in Avizo Wind	In Avizo Wind, when an unstructured model is displayed, the colormap does not appear in the display module ports because the colormap is contained in the data set. The documentation has been updated to explain this behavior.
510	Shortcut F1 doesn't work on editors dialogs	When an editor floating dialog boxes is active, pressing F1 will now display the help page of the corresponding editor.
571	Bounding box of an extracted surface is too big	Bounding box does not include any more unused points that may be contained in a surface data object.
608	Some SEGY file crashed with Avizo Earth SEGY wizard	Fixed.
674	Quantification: I_tophat command should display threshold on original data	Fixed. Tophat is applied to segment adaptively local features by thresholding the difference of the input image and its morphological closing or opening. The final interactive thresholding is now displayed on top of the original input image, which is much easier to interpret.
799	Erroneous example for tracker manual calibration	The tracker coordinates were given in decimeter instead of meter despite the comment "tracker coordinates reported in meters". The tracker coordinates were given with a tracker origin in the left/bottom of the screen instead of the written center/bottom.
829	VoltexHighQuality doesn't work on data set with double as data type.	This is now solved with Volume Rendering module.
832	LoadCmd doesn't store CSV Uniform Scalar Field parameters.	Fixed. This was preventing to reload network with uniform scalar field data in CSV format.
1150	Isosurface color field not updated in some cases	Fixed. When an Isosurface was colored with another field as color field, after some changes of the color field, the display was not updated correctly.
1233	ObjectRotate with netCDF data does not work with DemoMaker and attached MovieMaker	Fixed. ObjectRotate did not rotate until a new time step was loaded by netCDF controller.

1251	AffineRegistration: missing documentation for some module ports	Documentation has been completed.
1252	DisplayISL: distribution mode documentation must be improved	Documentation has been completed.
1306	Parameter editor: missing bundle value on label fields	Fixed. The Parameter editor now displays the bundle index, indicating the label value for the corresponding material.
1307	LineSet getPoint function not well documented	Fixed. When used with no argument, the function getPoint now returns the regular usage.
1387	IsosurfaceRendering cannot be displayed in only one viewer pane	This is now solved when using new Isosurface Rendering module, which can be made visible or invisible independently on multiple viewers. The former IsosurfaceRendering module could be visible or invisible only on all viewers at once.
1436	Quantification: auto_threshold command lack documentation for available methods	Documentation has been completed for the different algorithm methods: entropy, factorization (Otsu), moments.
1437	Isosurface won't update after pushing the apply button if only dataset changed	Fixed. Isosurface didn't update after pushing the apply button if a transformation has been applied to the dataset.
1463	IsosurfaceRender: incorrect display with 2 viewers	This is now solved with new Isosurface Rendering.
1476	VoltexHighQuality fails to display the double precision data	This is now solved with Volume Rendering module.
1512	Segmentation Editor: closing dialog is annoying	Fixed. The confirmation dialog warning about possible loss of selection when closing the Segmentation Editor is no more displayed after selection has been cleared.
1517	Color Dialog predefined color selection is too complicated	To select a predefined color, the user had to drag and drop from Custom Colors to the Current Color box. A simple click can now be used to select a custom color, or to undo change with Old Color.
1573	LabelVoxel doesn't describe the supported formats and data type	Documentation now specifies that LabelVoxel (Multi-Thresholding) doesn't support Uniform Scalar Field with float values.
1710	Leica/lif export builds invalid am file	Fixed. After loading a Leica/lif file in Avizo and saving it in .am format, it was not possible to reload the saved .am file. A message "... syntax error ... Couldn't read..." was issued. This is because "." dot characters were not supported in data parameter name, such as used in some Leica/lif metadata. Dot character is now supported in data parameter names and Avizo files using these are no more invalid.
1826	Avizo Wind license prevents from loading/displaying network using IDEAS time series with topology changes	The Avizo Wind IDEAS reader is different from the Avizo Standard one. The Avizo Wind one does not support topology changes. Now, when IDEAS files are loaded as time series, the Wind Edition reader is used first. If it fails (because of topology changes), then the Standard Edition reader is used.

1936	Can't open IGES or STEP files in a directory path with international characters (e.g. chinese)	(AVIZO ALL EDITIONS - IMPROVEMENTS AND NEW FEATURES FILE FORMATS ENHANCEMENTS) Extended support for international characters in file paths (e.g. Chinese or Japanese) File paths with international characters are now supported for the following formats: IGES, STEP; Avizo native format for images, grids and surfaces; DICOM, RAW and TIFF. Other files formats may still not support international file paths.
1947	No direct access in the Segmentation Editor to the related help	A question mark button has been added at top of the Segmentation Editor pane for direct access to the related help. Tooltips have also been added.
2042	Some DICOM files were incorrectly read	Fixed. In some case DICOM with lossless jpeg compression was incorrectly read (white lines appeared).
2047	Crash during LDA conversion of RGB files	Fixed.
2052	FilteredObliqueSlice do not show all the available filters	AVIZO ALL EDITIONS - IMPROVEMENTS AND NEW FEATURES New filters have been added: morphological opening and closing filters, Non-Local Means filter.
2060	Missing list of Avizo modules that require OpenMP	Avizo systems requirements now include the following note. Important note: Avizo is linked with OpenMP libraries to effectively use multiple processors. In order to be able to link your Avizo XPand Pack developments in Debug mode, at least the Microsoft Visual Studio 2008 Professional edition should be installed (i.e. Microsoft Visual Studio Express and Standard editions do not provide OpenMP libraries.)
2080	MovieMaker fails to export movies when starting Avizo with the option -no_gui	Fixed. Avizo now supports batch off-screen movie generation.
2130	Missing important note in System Requirements for using MATLAB	MATLAB module documentation has been completed for installation.
2256	OrthoSlice: binary transparency option considered as delayed, incompatible with some viewer transparency mode	Fixed. Rendering of OrthoSlice with 'binary transparency' option was incorrect when using Sorted Layers Delayed transparency mode (View>Transparency menu).
2257	Landmark can be "auto-picked"	Fixed. When adding landmarks with Landmark editor, already added landmarks cannot be picked anymore for new landmark location.
2339	OrthoSlice and other slice modules: "adjust view" option adjust the view in all viewers	Fixed. Now only the active viewer (white frame) changes its view orientation to match the changed slice orientation.
2369	Invalid input voxel size displayed in the Resample properties (precision not matching input data).	Voxel size is now displayed with correct precision.
2429	Bad export of vector or tensor fields in Matlab	Fixed. When exporting a vector field or a tensor field, the components in the .mat file were not in the correct order.
2581	CSV Point Cluster reader loses decimals	Fixed. The CSV format importer was losing decimals when reading floating point values.

2666	Default draw style for labels in segmentation editor should be hatched or dotted	AVIZO ALL EDITIONS - OTHER ENHANCEMENTS Segmentation Editor enhancements The default draw style for labels is now hatched. You can now change the default draw style for labels in the Preferences>Segmentation tab.
2986	CastField (Convert Image Type) uses last scale set for converting to labels	Even if scale port was hidden, the last scale set was applied. Scaling is no more applied when converting to label field.
3017	Camera trackball must be off by default	Camera trackball was inconvenient in a number of cases especially when using multi-viewer layouts. It is now hidden by default. You may still enable camera trackball using Preferences or viewer's right-click menu.
639	VoltexHighQuality crash after disabling then re-enabling raw stereo	This is solved with new Volume Rendering module superseding VoltexHighQuality.
1214	Colormap Icon in Tree view not always displayed	The colormap icons in the third column of tree view (Show Extended TreeView) were sometimes displayed and sometimes not.
1724	Avizo 6.3.1 standard package does not contain shortcut AvizoWind.app on Mac	Mac installer has been fixed.
1738	MacX links to Avizo applications missing	Mac installer has been fixed.
2376	SurfaceView does not render correct colors on some hardware	On some hardware such as Mac win ATI graphics card or PC with Intel graphics card, SurfaceView displayed wrong uniform color on surface instead of different colors per material. This is no more reproduced with Avizo 7.
2377	On Mac, Avizo 6.3.1 pkg doesn't install Avizo.app and corrupts Avizo.app from already installed Avizo version	Fixed.
532	VoltexHighQuality does not support Visilog labels colormaps	AVIZO FIRE EDITION - IMPROVEMENTS AND NEW FEATURES Visilog colormaps replaced by standard cyclic colormaps The specific colormaps used for instance for label images or binary images created by the Quantification module, are now replaced by standard colormaps labels and labelsBinary. These colormaps use new properties for cyclic colors and for preventing color interpolation across values.
540	Increasing number of slices of VoltexHighQuality make them disappear	This is now solved by using the new option "Use high precision frame buffer" added in the Rendering tab of the Preferences dialog (accessible from menu Edit>Preferences).
568	Some TIFF image can't be displayed correctly	TIFF reader has been enhanced.
599	The console command "setStereo -b" doesn't update the Stereo Preferences dialog	Now "Zero Parallax Balance" and "Camera Offset" and the slider positions are updated
631	AlignSlice menu "Options/Fix reference" not updated after running the setFixedReference TCL command	Fixed. When using TCL command setFixedReference, the menu is now updated accordingly.
633	Segmentation editor brush tool slower than in previous versions	You could easily have "holes" when moving quickly brush tool in segmentation editor. The brush tool is now much more responsive.
636	Snapshot dialog: when pressing Browse another filename extension is added to the existing one	Fixed. In the "File name" field of the Save File dialog one could read filename.jpg.jpg

668	Segmentation editor: magic wand "All slices" option clears current selection in some cases	Fixed. Magic wand "All slices" option cleared the current selection when the range of the magic wand scrollbar was out of the min/max range of the image.
775	Line and SplineProbePlot-Object attributes should not be reset	Fixed. Line and SplineProbePlot-Object attributes were reinitialized to default values when changing the orientation port of the probe.
795	Snapshot doesn't support multi-viewers display	This is now supported. Only the current view was exported. It is now possible to specify option "Capture all viewers".
1156	System Info save report doesn't save CPU info	It only saved OpenGL information. Now it saves also CPU information.
1160	File browser very slow when opening a directory on the network with a lot of files	Opening a remote directory with 8000 jpeg files took 100 seconds (Windows explorer takes 1 second). The new file dialog fixes the problem since it uses the native implementation.
1221	Opening time series failure when loading Tetra or HexaGrid with data field	Fixed. Time Series Control module was not created and only the first time step data appeared in the pool.
1224	GridCut: Translate port is reset when connecting the module to a new dataset	This port now remains unchanged when the data set connection changes.
1270	No animation when enabling the option "interpolate between frame" of TimeSeriesControl	Fixed. There was a specific issue related to some modules such as Isosurface.
1370	No helpful message and sometimes crash when Avizo fails to load a stack of images	Fixed. In some cases, when loading data larger than available memory, a message was displayed in the console "could not allocate xxx bytes". Then Avizo could crash, or create incomplete data object without warning. Now a clear warning message is displayed, and Avizo will not try to allocate or load data larger than available memory.
1385	Undocumented module Display>BoundaryIDs	BoundaryIDs was the counterpart of tetra grid BoundaryConditions for hexa grids. This module is now also documented (new name is "Boundary Conditions").
1386	Quantification module command persistence broken	Fixed. Unexpected changes in Quantification module names in some cases. It prevented to reload saved module networks.
1388	NetCDF reader is too restrictive	Compliance checking is now relaxed for NetCDF reader. A netcdf file that matches the Climate and Forecast (CF) Metadata Conventions version 1.0 couldn't be loaded in Avizo Green if ":Conventions = "CF-1.0" ;" was not found in the header. Now a warning is simply displayed.
1413	am reader doesn't support dot characters in material names	Fixed. Dot "." character can now be used in material names.
1534	MovieMaker doesn't support exports to filenames on the network	MovieMaker can now use network file paths.
1566	Viewer snapshot console command failure when using the option -offscreen	The console command "viewer snapshot -offscreen 1400 1024 test.jpg" returned the error "-offscreen: unknown format". "viewer snapshot -offscreen ..." now works for making a snapshot of multi-viewers layout. For a single viewer use "viewer 0 snapshot -offscreen ...". Note that the viewer's snapshot button and dialog box now also

		allows creating snapshots of either single viewer or multi-viewers layout, optionally offscreen with specified size.
1595	Abaqus export doesn't store materials of exported surfaces	Fixed. Abaqus files are now exported with all materials.
1712	Interpolation of lasso selection in segmentation editor prevents from selecting voxels at the edge of the slices	The first and last slices have all voxels selected but the interpolated selection missed some voxels
1767	Brush tool of the segmentation editor selects less areas since Avizo 5.1 (when moved too quickly)	You could easily have "holes" when moving quickly brush tool in segmentation editor. The brush tool is now much more responsive.
1884	Changing the object name in Image Read Parameters dialog has no effect	The Image Read Parameter dialog now allows setting the name of the object created in the pool/project.
673	Equalize filter and OrthoSlice with histogram mapping type do not work on 16-bit images	Fixed. The histogram equalization worked only for images with a dynamic range of 4096 levels. Now it works fine for all types of images.
802	Bad scroll wheel step for Integer ports	Fixed. The scroll wheel step was set to 10 instead of 1 when the port value was more than 1000.
1144	Avizo Wind license prevent from importing Tecplot ascii files	Fixed. Avizo Wind extended reader only supports binary format. When reading an ASCII Tecplot file, the Avizo Standard reader is now used, creating standard Avizo data objects instead of Avizo Wind data objects. A warning is displayed in console panel suggesting converting to binary format for taking full advantage of Avizo Wind capabilities.
1180	VoltexHighQuality image disappears at some angles in some case	This is now solved by using the new option "Use high precision frame buffer" added in the Rendering tab of the Preferences dialog (accessible from menu Edit>Preferences).
1181	LatticeAccess not working on float LDA	Fixed. Lattice Access on float LDA extracted incorrect data.
1212	Update problems of display for data with time-step	Fixed. When a transient data was loaded and a gridview connected (or a crosssection...), if the time animation was launched, the gridview was updated at the first time step but not after.
1268	RemeshSurface builds surfaces that don't pass the Intersection test of the surface editor	Improved. RemeshSurface now avoids intersection in most cases. Guidelines have also been added in documentation for limiting these issues.
1778	Crop editor crash when applying flipz to a large volume	Fixed.
1825	Some CSV files could not be read correctly as point clusters	Fixed.
1890	AlignSlices/Landmark alignment crash	AlignSlices/Landmark alignment crashed when triggered on a data previously aligned with AlignSlices
1077	No right-click menu in full-screen mode on Windows 7, cannot revert to normal mode.	Fixed. Right-click menu or F11 hotkey can be used for turning full-screen mode on and off.
2501	Quantification exeCommand does not take into account some parameters.	NEED REVIEWING
1137	Quantification:convex_hull gives wrong result in some cases	Fixed.

1176	Port interconnection not working when moving an orthoslice with the mouse	Fixed. When connecting the Slice Number port of two OrthoSlices and when moving the slice position using the mouse in the 3D view, the connected Ortho Slices was not updated accordingly.
1203	Quantification input unwanted reset	Fixed. When choosing a command, the Quantification module no more resets input to previous one.
1205	VoltexHighQuality performance issue with full optimization option	Fixed. In some cases the volume rendering performance dropped when full optimization was enabled, unless lowering the video memory amount set in Preferences, LDA tab.
1271	Quantification command "convex_hull" mistakenly shown as operating in 2D and 3D in GUI	Now convex_hull is identified as per "XY planes" only.
1326	When loading data using a PortFilename in multi-file mode, a file can be loaded twice in one step	Fixed. When loading files through a PortFilename in multi-file mode, duplicated filenames are now checked.
1377	Annotation crashes Avizo if certain TCL commands are entered	Fixed. "Annotation text connect" produced a crash.
1417	Empty connection for sliceNumber crash	Fixed. Entering command "OrthoSlice sliceNumber connect" without argument was causing a crash.
1427	Cannot load .csv file with headers and blank lines	CSV reader has been fixed.
1429	Quantification: create_measure GUI - expression functions do not work in 64-bit	Fixed. Custom measure expressions with functions now work in 64-bit version of Avizo.
1434	Segmentation editor: Propagating contour does not release memory	Fixed. The propagating contour tool now releases all used memory.
1462	Cannot start Avizo Fire as administrator	Fixed. Avizo Fire could not be started correctly as administrator on Windows 7 in some case.
1525	Quantification: document method used by area3d command	area3d help now refers to section about Crofton perimeter where the equivalent method for 2D is detailed.
1544	LegoSurface always create a new output upon apply	LegoSurface now reuses the existing output data object when pressing apply, like SurfaceGen does.
1546	Can't convert twice an images stack to LDA format, 1st file remaining in data directory	Fixed. LDA now creates and removes temporary 1st file in standard temporary directory and doesn't require anymore write permission in input data directory. Since Avizo could fail converting because of write permission, it could convert actually to LDD format without warning.
1556	Improve warning when loading compressed .am AmiraMesh as External Data	Upon detecting Avizo compressed format (HxZip field) a new dialog displays: "This Avizo .am file contains ZIP compressed data and cannot be read as External Disk Data. For access as external disk data, save to .am format without compression, or convert to Large Disk Access (LDA) format."
1557	Can't reload module network using CSV file, CSV reading options no scriptable	CSV reading options are now scriptable and Avizo can now reload networks using CSV data other than default.
1577	With Avizo Wind unstructured models, the histogram in Colormap editor is empty	Colormap Editor can now display histogram of scalar fields from Avizo Wind unstructured models, in addition to Avizo hexa grids, tetra grids, surfaces, regular grids or images. The displayed histogram corresponds to the selected data in the colormap editor.

1583	Plot Tool window is not saved correctly in hx networks	For Avizo modules that create a 2D plot window, if the window was moved away from its default location, an error appeared when reloading the network. Reloaded network now restores correctly the size and position of Plot Tool windows.
1604	LDM conversion looks abnormally slow in some case, e.g. from 2D image stacks	Conversion performance has been much improved for stacks of 2D images, in particular for large images.
1621	FitleredObliqueSlice crashes with Edge Preserving Filter (step port)	Fixed. User could crash Avizo by setting Edge Preserving filter step port to 0, for instance while tuning parameter with mouse wheel. Step cannot be set anymore below 1.
1626	Abaqus reader crashes when adding all datasets to some models	Fixed.
1639	Quantification command help access issue - Acrobat 10 compatibility	Quantification command help now supports Acrobat Reader X. Pressing F1 or command help button in Quantification module did not show the help corresponding to selected command in Acrobat Reader.
1642	Quantification module changes parameters	Fixed. When choosing a command, the Quantification module no more resets input to previous one.
1643	seqfrom3d/seqto3D issues with needless copies and persistence	A new port Interpretation has been added to easily apply commands slice by slices (XY planes) or in all directions at once (3D), when applicable. This supersedes the seqfrom3d and seqto3d commands. It was not possible to save consistently a network that uses seq2D/seqfrom3D. It was often required to copy needlessly data from/to 3D for applying commands in 2D mode.
1732	Quantification module wrong input change	Fixed. When changing the name of the command the input changed.
1791	ParticlePathlines doesn't display box	Fixed. When active option was checked in "Display box" port, the box didn't appear.
1792	SurfaceView wrong display after removal of unused points	Fixed. After removing unused point from a surface when saving it to file, SurfaceView display was wrong.
1865	Some 16 bits DICOM files cannot be read properly	Fixed. The DICOM reader has been extended to support more format variations.
1960	Quantification getCommand doesn't provide parameters anymore	Until Avizo 6, one could get the command and parameters from Quantification module using TCL getCommand This didn't work anymore in 6.3.1: getCommand only returned the command name.
2010	Preference 'show colormaps connected to objects' must be disabled by default	AVIZO ALL EDITIONS - USER INTERFACE ENHANCEMENTS Colormaps connected to modules are now hidden by default to avoid confusing the project view. You can enable the option "Show colormaps connected to objects" from menu View>Preferences, in Layout tab, Project View box.

2040	Quantification crashes when output name has a space character	Fixed. Quantification module now prevents to insert whitespaces in result names. Note that Avizo data objects can't have a whitespace in their name (replaced by dash). It is however possible to save data to disk with whitespaces in file names.
2189	Missing link to Avizo XPand reference doc	AVIZO XPAND ENHANCEMENTS XPand menus - Programmer's Guide and Reference, Development Wizard, Qt Inspector XPand API Programmer's Reference can now be accessed from Avizo Help menu, in addition to Programmer's Guide. Do not miss also the Avizo Code Book, located in doc subdirectory of Avizo installation directory.
2204	Adobe Reader X is not supported by Quantification module's 'command help' button and F1 hotkey	Fixed.
2277	Crash with viewer seek 's' shortcut	No more reproduced with Avizo 7. Avizo crashed when picking multiple times in viewer while holding "s" key pressed.
2287	Ctrl-A key shortcut for Select All in console doesn't work	Fixed.
2299	AffineRegistration creates temporary hidden objects that are never deleted	Fixed. Temporary data was not removed when using the "Align principal axes" option of the AffineRegistration module.
2366	Crash when using TCL command 'connect' to non-existing object	Fixed. In some case, using the TCL command "connect" with an invalid argument caused a crash. A message is now displayed "No object with name: ...".
2389	Missing font port for DisplayDate and DisplayTime module	AVIZO ALL EDITIONS - OTHER ENHANCEMENTS A new port is available for changing font name and size for Display Time and Display Date modules.
2395	HeightField initial display is slow - defaults settings should be changed	AVIZO ALL EDITIONS - USER INTERFACE ENHANCEMENTS Height Map Field (HeighField) default draw style and scale changed For quicker display, the default draw style for Height Field Map module is now shaded instead of outline. The default scale is now -0.05 and port min/max allows negative and positive scales.
2407	Tetra quality test of surface editor doesn't provide the same aspect ratio on the attached surface with Avizo 6.3 and 6.3.1	Fixed. Tetra quality test of surface editor was incorrect in some case in Avizo 6.3.1.
2478	Shear module: angle cannot be greater than 40	Fixed. Shear angle is no more limited. Note that larger angles increase result data size.
2617	Quantification: I_analyze error in some cases	Fixed. A message "lp function failed" appeared in some case at the end of processing.
2620	Quantification:rgradient3d crashes in some cases	The command rgradient3d of Quantification module has been fixed.
2969	CannyEdgeDetector has a button Dolt instead of using the standard button Apply	Canny Edge Detector now uses the Apply button.
508	CalculusMatlab doesn't keep bounding box	Fixed. The output of CalculusMatlab didn't have the same bounding box as the input.
1036	Matlab module should output in existing result data object instead of creating a new one	Fixed. When running a CalculusMatlab module twice, two results were generated making it impossible to connect the output to other processing modules. Now, computations are

		performed in-place allowing to use CalculusMatlab in a processing chain.
1905	ObliqueSlice can't display first slices and last slices in some cases	Depending on the size of the volume, ObliqueSlice couldn't display first slices and last slices.
2302	Quantification module: precision issue with getFieldArrayValueX	Fixed. In some case, I_analyse results lost precision when retrieved by TCL script commands.
2448	ObliqueSlice and other ArbitraryCut modules: bad rendering when the input data contains a scale.	Fixed. When the input of an ObliqueSlice contained a scale, the ObliqueSlice appeared black as soon as it was rotated. This was also true for all related modules based on ArbitraryCut such as Isoline, Vectors, PlanarLIC, etc.