Analyze 11.0

New Features & Enhancements

Introduction

Welcome to the Analyze 11.0 New Features and Enhancements document. This document provides an overview of the new features and enhancements available in Analyze 11.0.
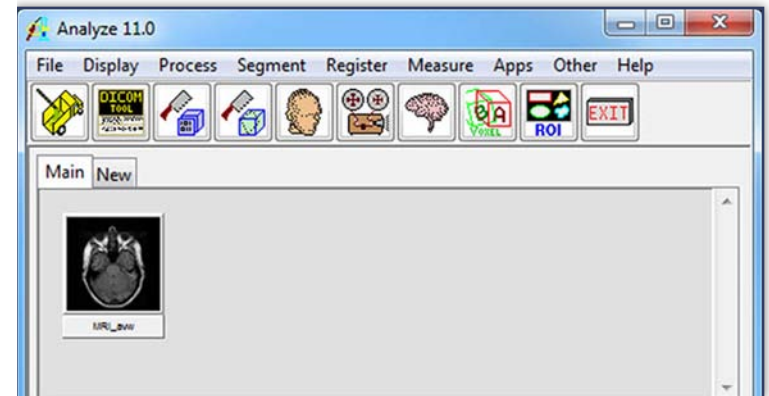
Table of Contents
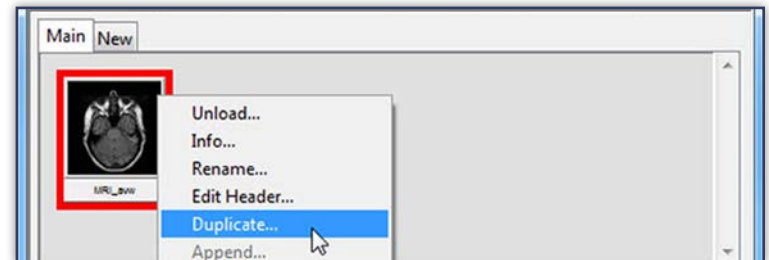
General Features & Enhancements

Auto-Load AnalyzeAVW files

- Double-click on an AnalyzeAVW (*.avw) file to load it into Analyze.

  - If Analyze is not open, double-clicking on the AnalyzeAVW file will automatically launch Analyze and load the file into the first workspace.

  - If Analyze is open, double-clicking on the AnalyzeAVW file will load it into the current workspace.
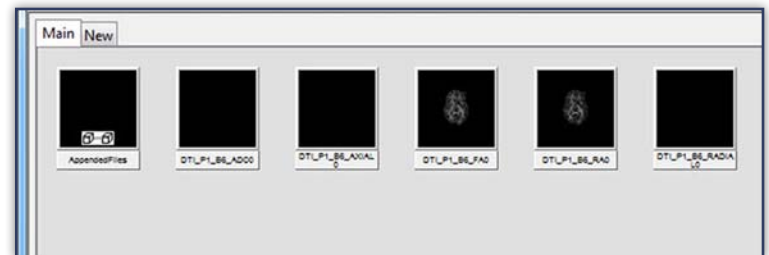
Duplicate Volume

- Right-click on a volume image in the workspace and choose "Duplicate" to create a copy of it.

Retain Names of Appended Volumes

- Names of 3D volumes are remembered when appended in a 4D multivolume. If the multivolume is un-appended (right-click > Un-append), the 3D volumes are created in the workspace with their original file names.

- Example Use: Append multiple DTI maps as a 4D multivolume for quick ROI sampling. After sampling, unappend multivolume to re-create maps with their original names in the workspace.
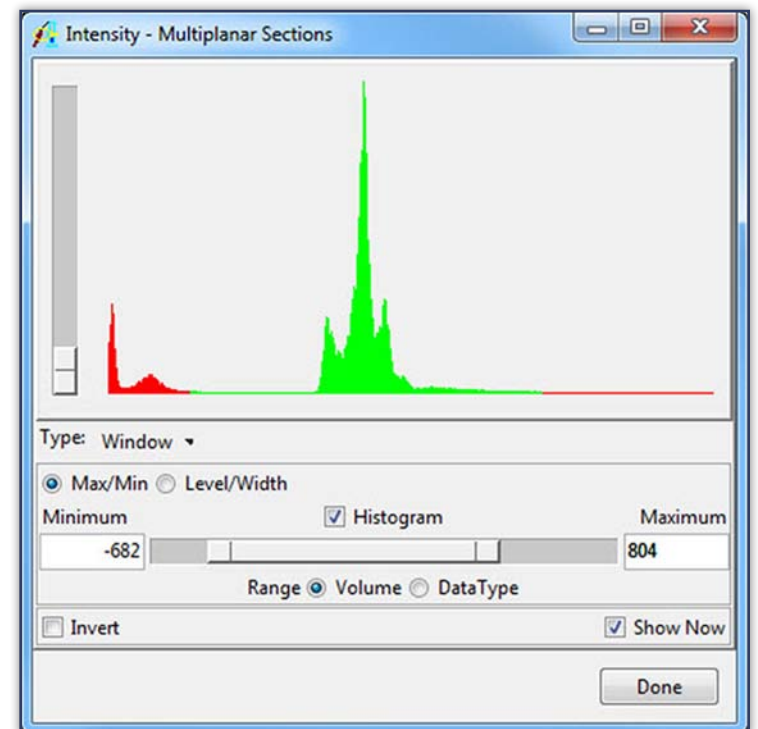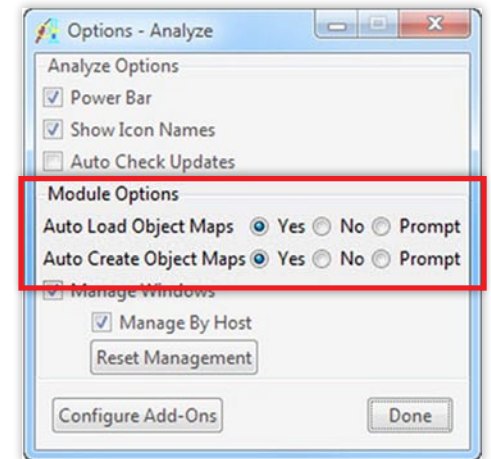
General Features & Enhancements

Auto-Load and Create Object Map Options

- Analyze now provides options to control how modules handle the loading and creation of object map files. The default behavior for modules can be selected in the Other > Options menu in the main Analyze window.

- Auto Load Object Maps:

  - "Yes" (default): Modules will automatically load an object map if one is found in the same directory as the loaded volume.

  - "No": Modules will never load an object map automatically.

  - "Prompt": If a related object map is found, then the module will ask the user if they want to load it.

- Auto Create Object Maps:

  - "Yes" (default): Modules will automatically create an object map for the loaded volume.

  - "No": When setting the "Change" option to Object Map in a module, the user will have to confirm that they wish to create an object map.

  - "Prompt": Upon opening the module, the user will be asked if they wish to create an object map.
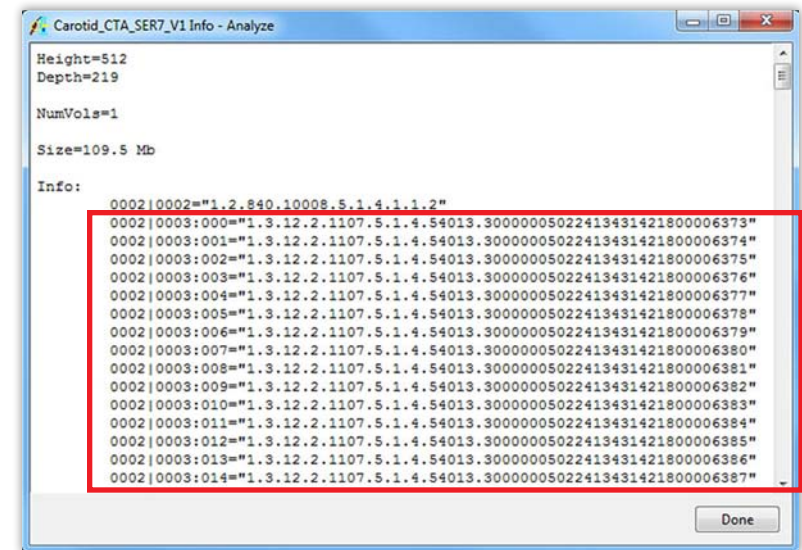
Intensity Window Histogram Display

- The histogram for the loaded volume can now be displayed in the View > Intensities window of all Analyze modules. This allows for faster examination of values ranges associated with specific tissues, and more intelligent windowing.

Output DICOM Images with Spatial Information

- DICOM images can now be output from Analyze with slice-by-slice spatial information.

  - Image Position (Patient) and Slice Location fields from the original DICOM images carried over to the files output by Analyze.

  - Currently only available for images that do not undergo spatial transformations in Analyze, e.g. resizing, oblique reformatting, registration transformation.

Additional DICOM Anonymization Options

- New options to anonymize Study and Series information in DICOM images.

  - Study options: Change Study ID, Referring Physician, Study Description, and Accession Number.

  - Series options: Change Series ID, Series Description, and Procedure Name.

  - Add DICOM: Use to change the value of other DICOM tags, or to add non-standard DICOM tags.
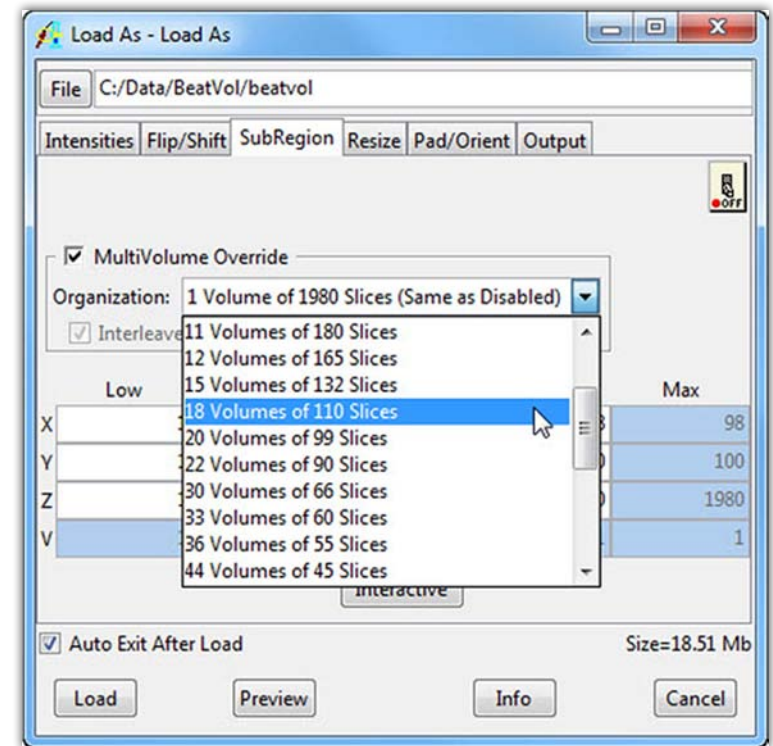

Filter Displayed Images by Import Date

- New "Date of Import" option in Configure Search window (accessible from DICOM Tool right-click menu) allows the Patient/Study/Series records displayed in the DICOM Tool to be filtered according to the date they were imported into the database.

- Example Use: Display all Patients who had images imported between February 1, 2012 and February 29, 2012.
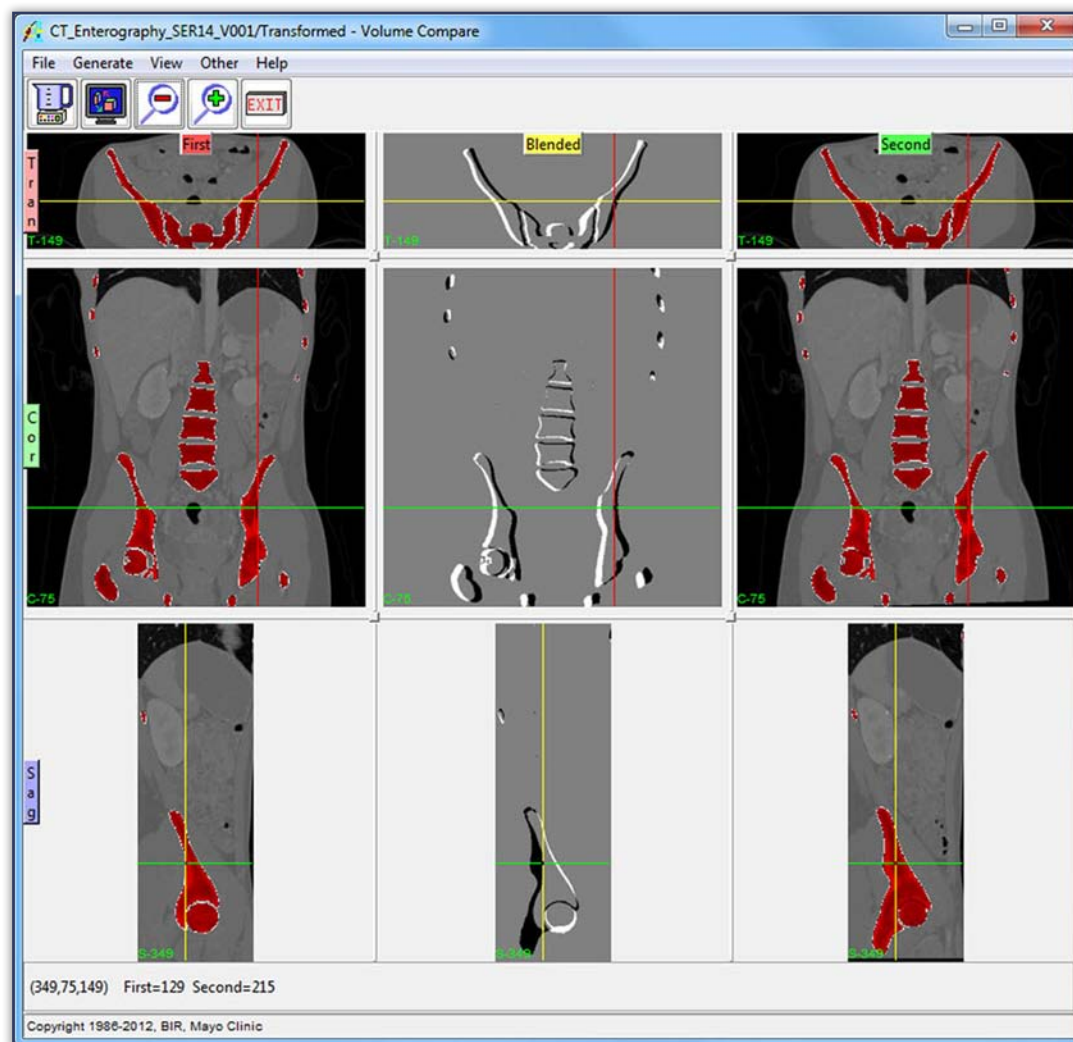
Load As

Volume Parsing Options

- New "MultiVolume Override" option in the SubRegion panel allows you to divide images from the selected file(s) into multiple volumes.

- Options provided to create volumes from sequential images or interleaved images.

- Example Use: Separate two data sets stored in the same file into individual 3D volumes.
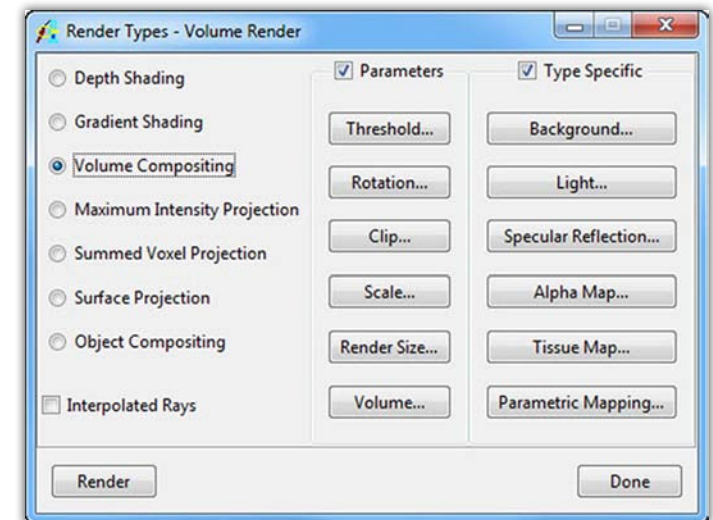
Volume Compare

"Object Difference" Blend Type

- Visualize the differences between two object maps using the new "Object Difference" Blend type.

- Example Use: Compare regions segmented by different users.
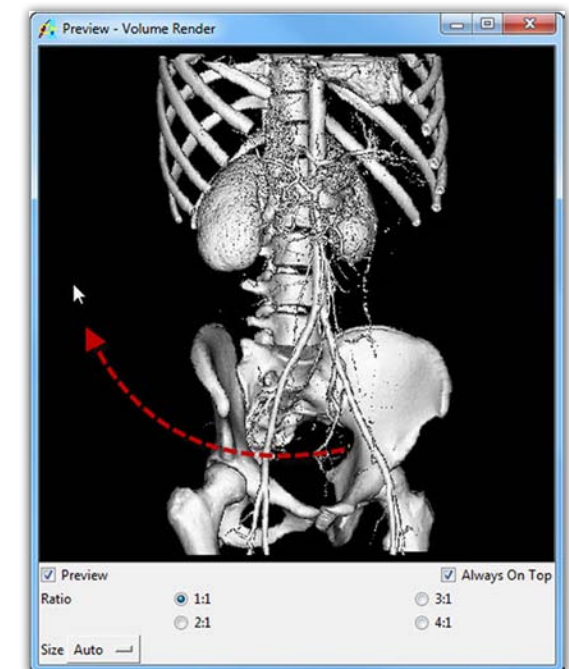
Volume Render

New Interface for Rendering Options

- The new "Render Types" window provides quick and easy access to controls for rendering options:

  - **Render Types:** Choose a rendering algorithm.

  - **Parameters:** Adjust Threshold, Rotation, Clip, Scale, Render Size, and Volume.

  - **Type Specific:** Enable or change options specific to the selected rendering algorithm.
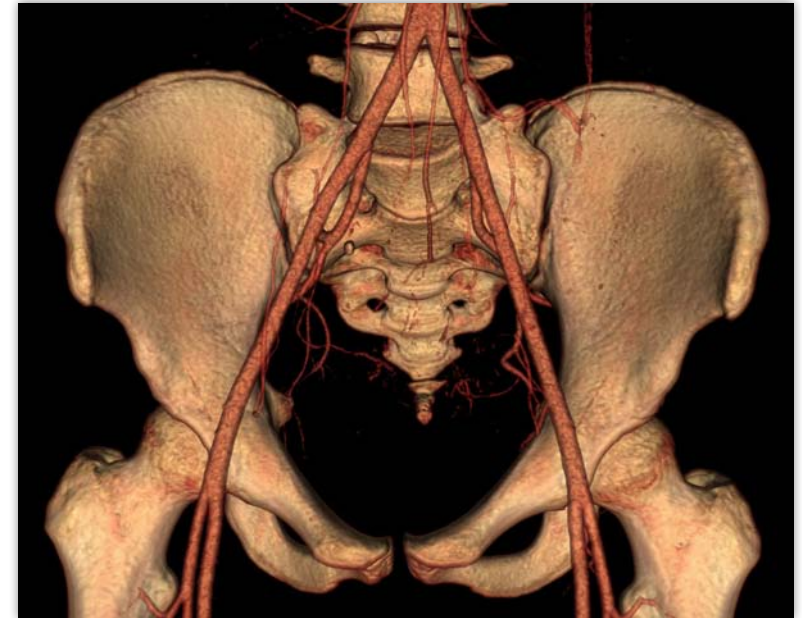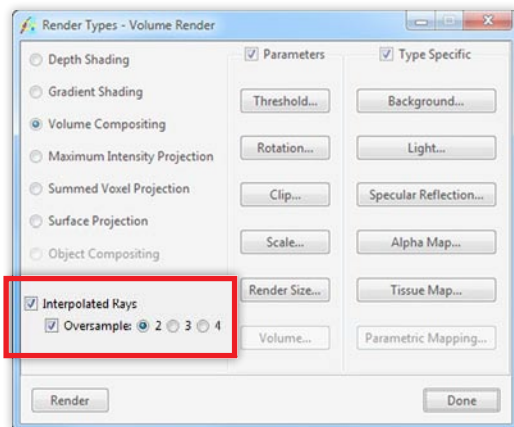

Rotate in the Preview Window

- Drag-and-drop the rendering directly within the Preview window to rotate. Eliminates the need to open the Rotation window for interactive rotation.
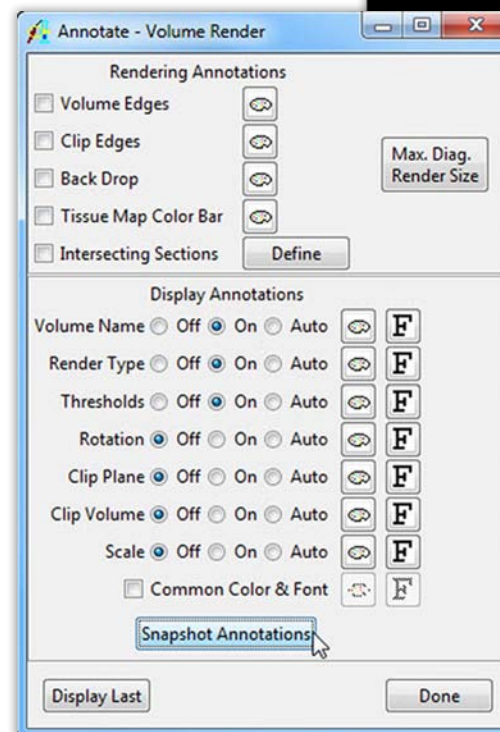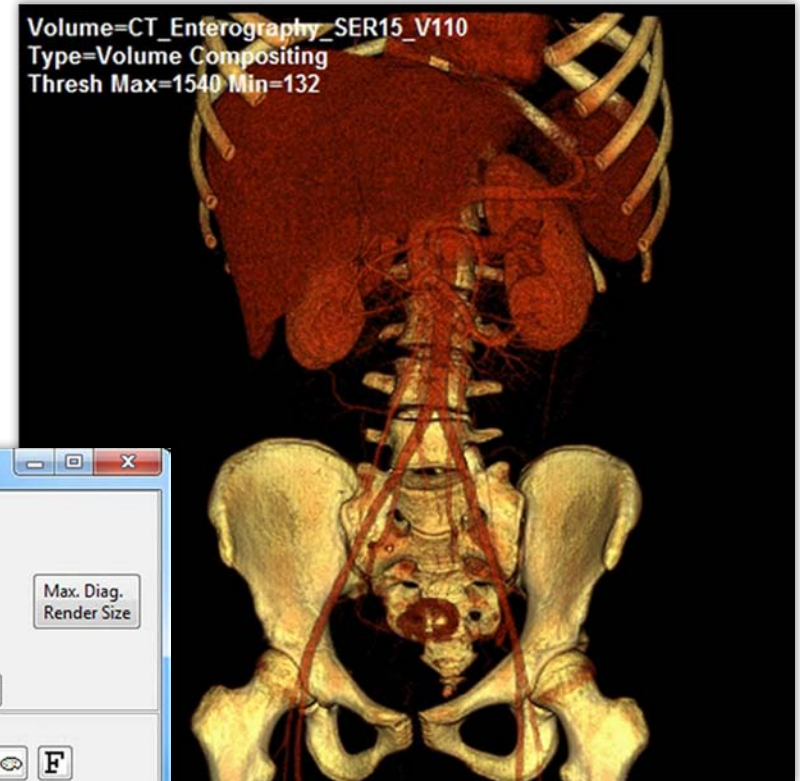
Volume Render

Improved Volume Composited Renderings

- Renderings created with the Volume Compositing render type will have the "Background Color" composited into the rendering, significantly enhancing the overall display of the rendering.

- New "Oversample" option can be enabled when using the Volume Compositing render type with "Interpolated Rays". Oversampling casts a ray through every output pixel in the rendering, providing an improved visual display.

Save Renderings with Display Annotations

- New "Snapshot Annotations" button in the View > Annotations window allows the current rendering to be saved to the Analyze workspace with the selected Rendering Annotations and Display Annotations options.

- Example Use: Save a rendering with Display Annotations to document how it was created (i.e. the Render Type used, Threshold values, Rotation angle).
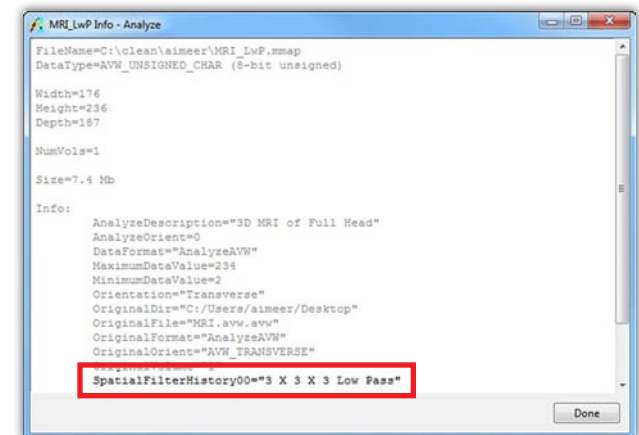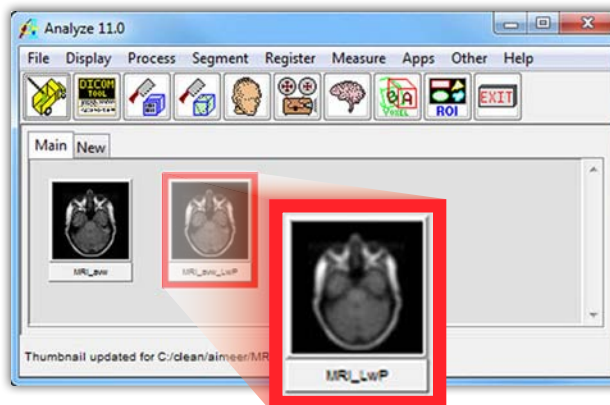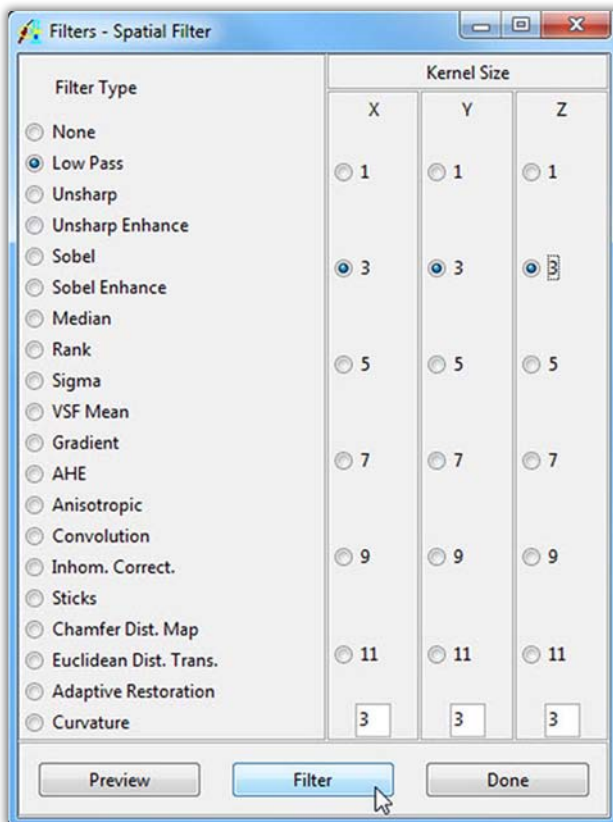
Spatial Filters

Filtering Actions Recorded in the Volume

- Filter name **[1]** is automatically appended to the name of the filtered volume output to the Analyze workspace **[2]**.

- Applied filters and related parameters (e.g. Kernel Size) are recorded in the header of the filtered volume. A "SpatialFilterHistory" field allows for tracking of sequential filters **[3]**.

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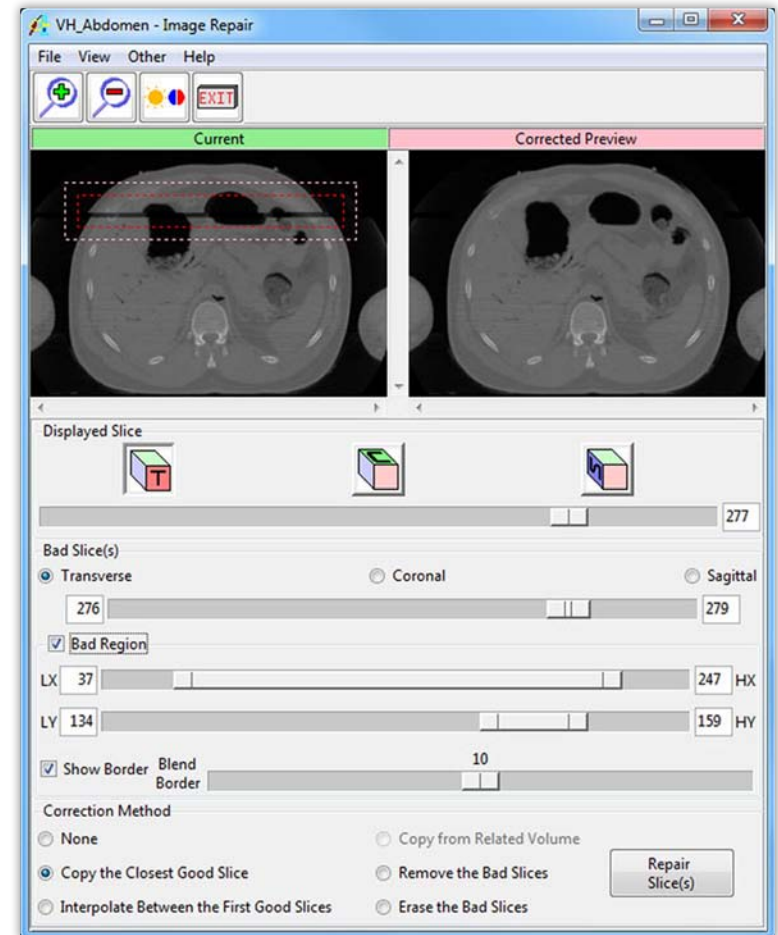

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Image Repair

New Module: Image Repair

The new Image Repair module provides the ability to repair bad regions or slices within a loaded volume and object map. Options are provided to correct by copying voxels from a nearby "good" slice, copying from voxels in a related volume, or interpolating between voxels in good slices on either side of the bad slice(s). Bad regions and slices can also be "erased", with all voxel values being changed to the data type minimum. Bad slices can also be completely deleted from the volume.

Correct Corrupt Slices

- Correct one or more "bad" slices in a loaded volume.
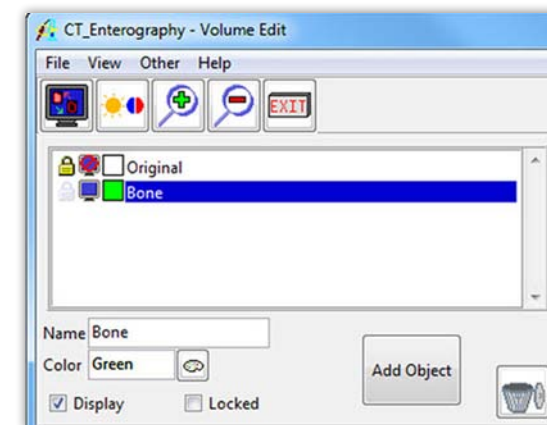
Correct Corrupt Regions

- Correct a specified region within a slice.

    - Corrected voxels can be gradually blended with the surrounding area using the "Blend Border" option.

Volume Edit

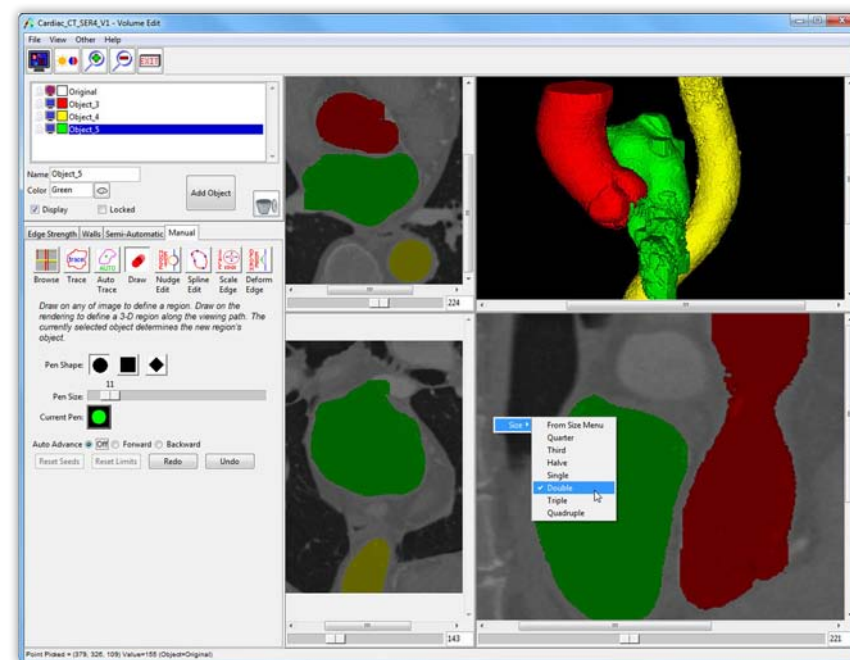### "Original" Object Control Options

- Added ability to change attributes of the Original object, including Name, Color, Display, and Opacity.

- Added option to "lock" the Original object. Allows segmentation operations to be further restricted to selected objects.

Independent Display Size Controls

- Set the display size of each orthogonal orientation and the 3D rendering independently.
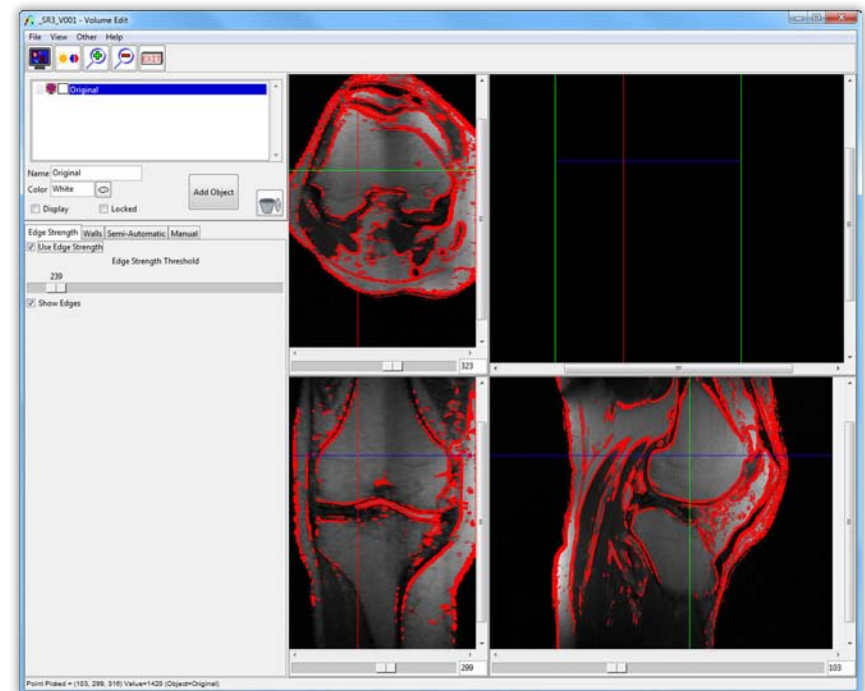
Time Saving Shortcuts

- **"Browse" Quick Key:** Press the <b> key on your keyboard to quickly switch to "Browse" mode.

- **Object Selection Shortcut:** Click on an object with your middle-mouse button in any of the 2D images and it will become selected in the Objects pane.
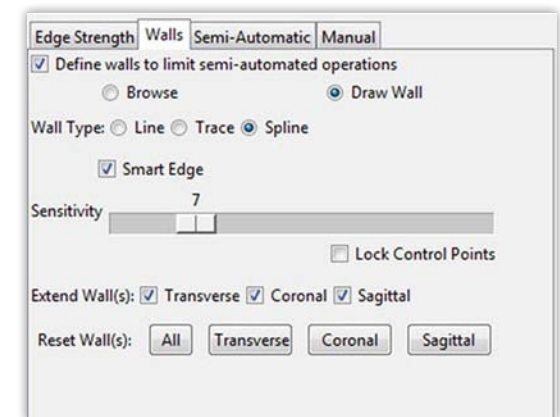
Edge Strength: Improved Edge Display

- Detected edges below the specified Edge Strength Threshold are now highlighted in red.

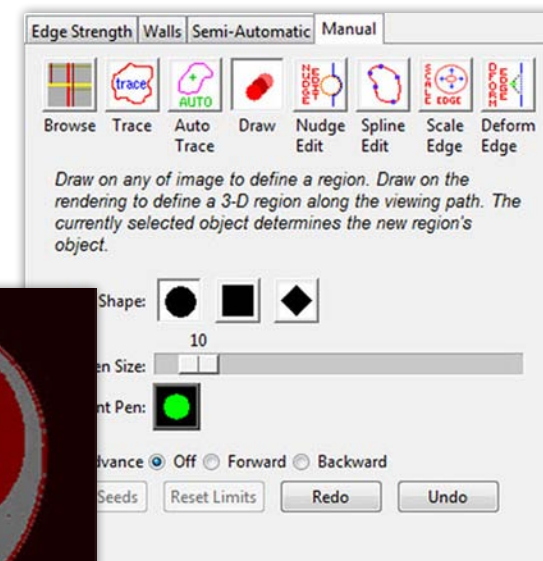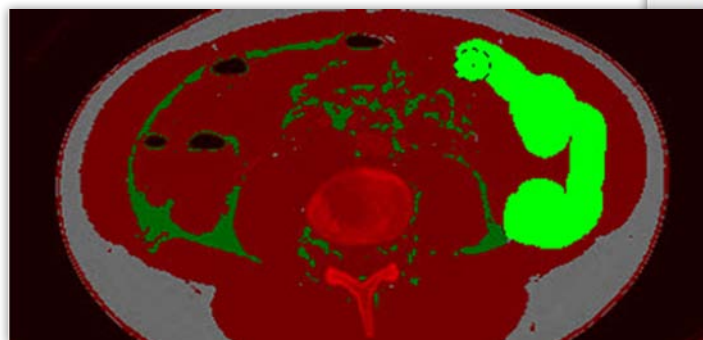- The "Show Edges" option allows for continuous display of edges while reviewing 2D slices.

Walls: New "Spline" Wall Type

- Walls to limit semi-automated segmentation operations can now be defined using a spline. Features of the "Spline" wall type include:

  - Movable control points along the spline to allow for greater control over the definition and placement of the wall.

  - "Smart Edge" option to attract spline to edges (areas of high gradient). "Sensitivity" slider controls the maximum number of voxels out from the original line that can be considered for an edge. Spline points can be locked to prevent them from moving when applied to a different slice.
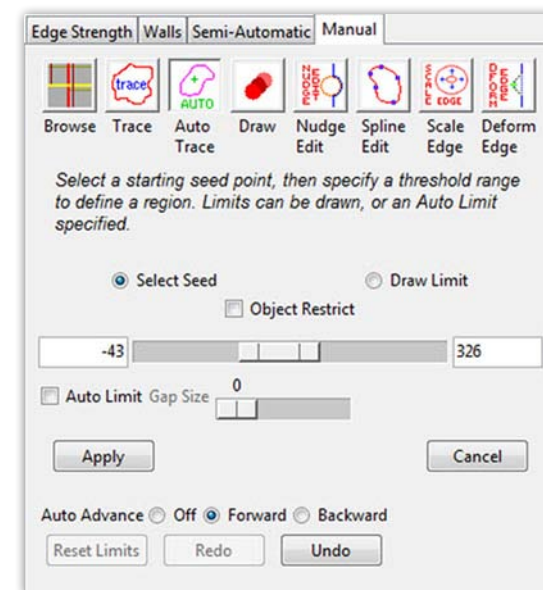
Volume Edit

Manual: New "Draw" Tool

- The new "Draw" tool under the Manual tab allows objects to be defined using a painting-like action. Regions painted over in a 2D slice or on the 3D rendering will become part of the specified object.

  - Choose between Circle, Square, and Diamond pen shapes.

  - Adjust the size of the pen in voxels.

  - "Current Pen" indicates the color of the object that will be defined.

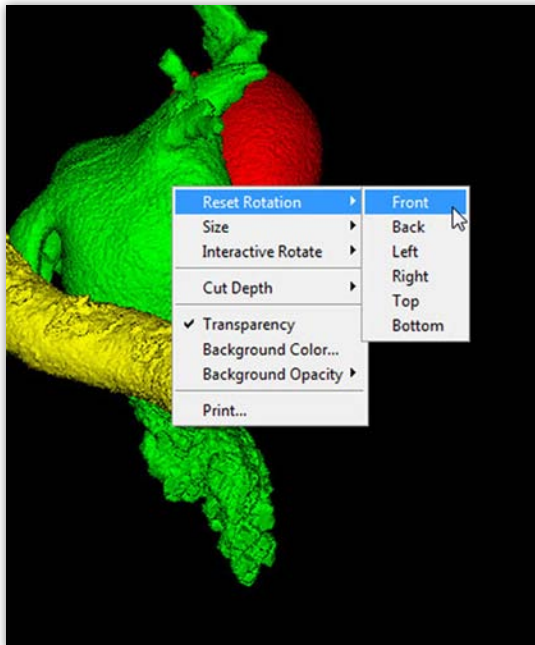## Manual: Options for Greater Efficiency

- **Auto Advance:** Automatically advance the display forward/backward one slice after a region is defined.

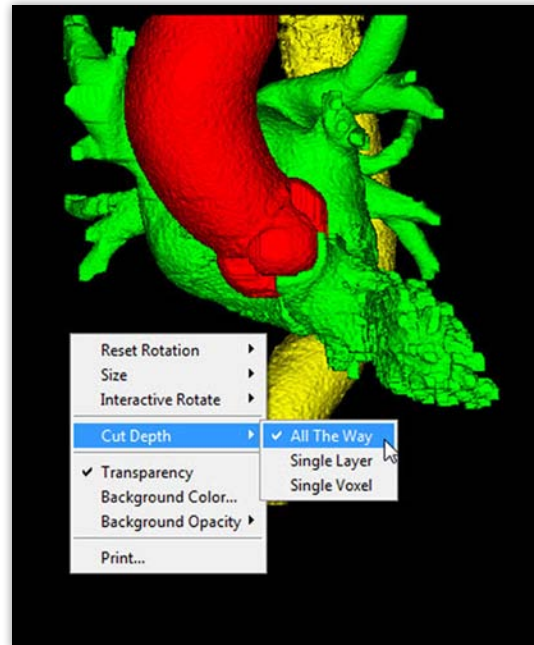- **Quick Key:** Press <a> to apply a region.

Volume Edit

Additional Rendering Controls

- **Rotation Options:** Reset rendering to a Front/Back/Left/Right/Top/Bottom view from a "Reset Rotation" right-click menu **[1]**.

- **Cut Depth:** Choose whether regions defined on the rendering with the manual Trace or Draw tool should cut "All the Way" through (default), or just through a "Single Layer" or a "Single Voxel" of the rendering **[2]**.

- **Background Color/Opacity:** Change background color and background opacity for the rendering **[3]**.
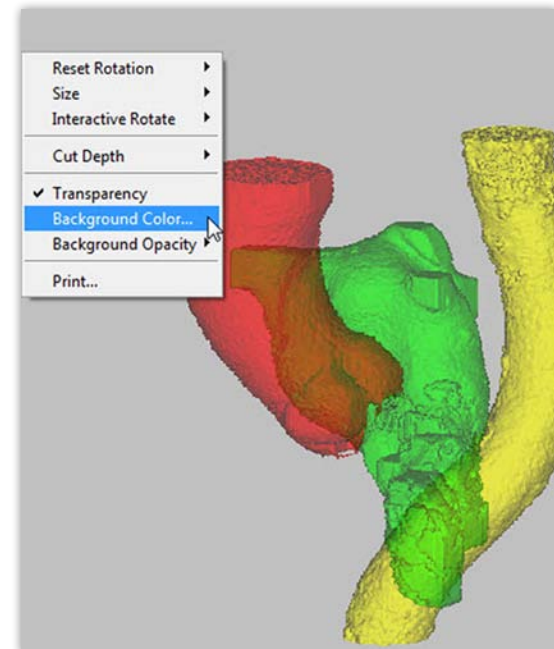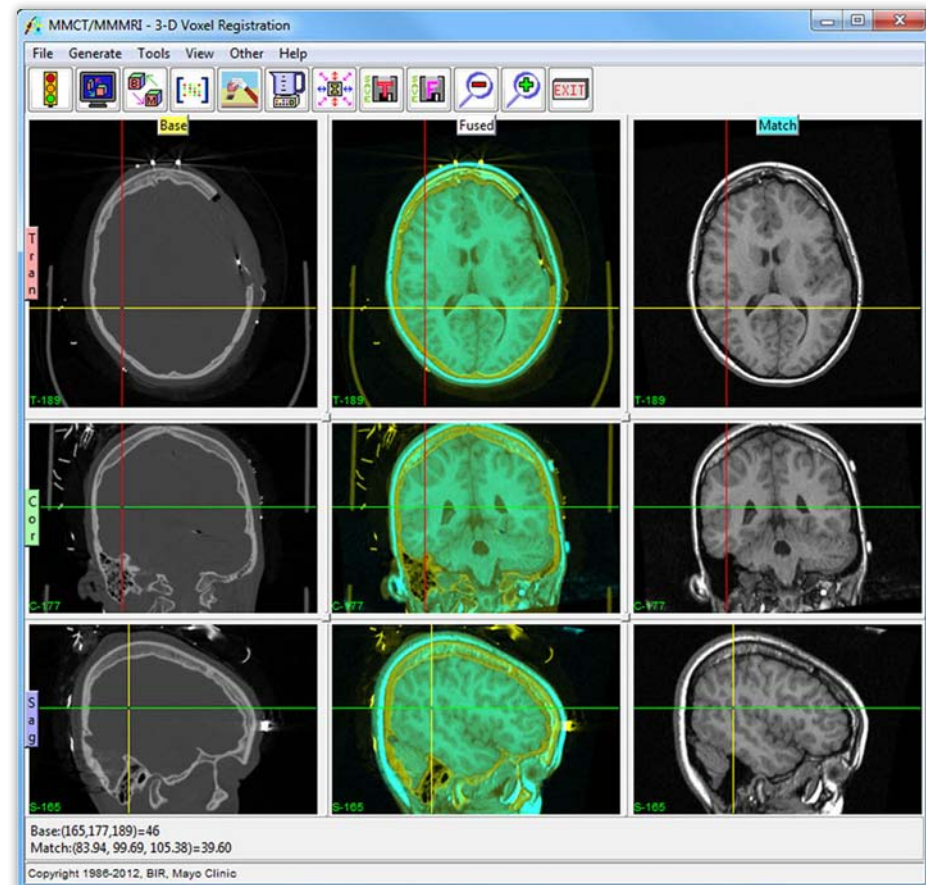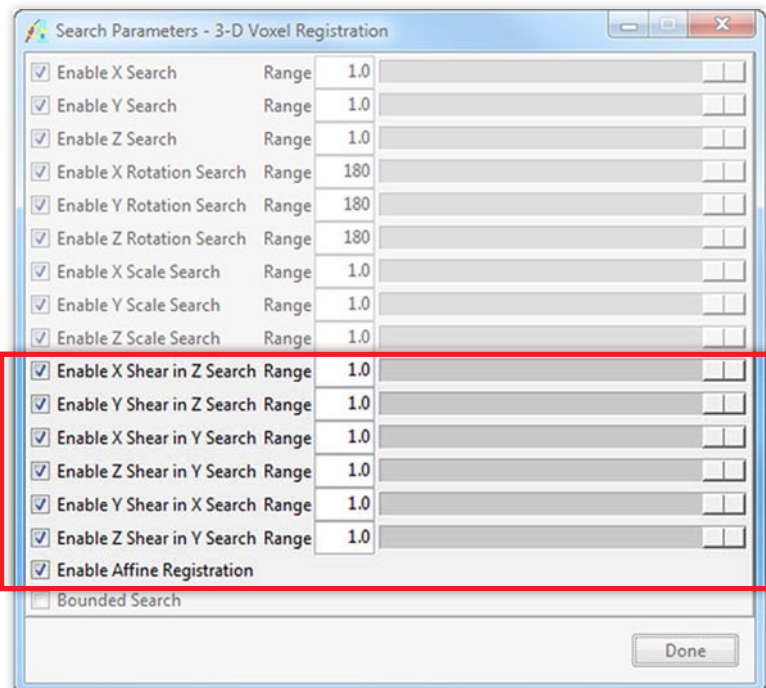
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3D Voxel Registration

Fully Affine Registration Capability

- Register 3D volumes with 12-degrees of freedom: X/Y/Z translation, rotation, scale, and shear. By default, only translation and rotation are considered, but scale and shear degrees of freedom can be added to the registration search process in the Generate > Search Parameters window to allow for a full affine registration transformation.
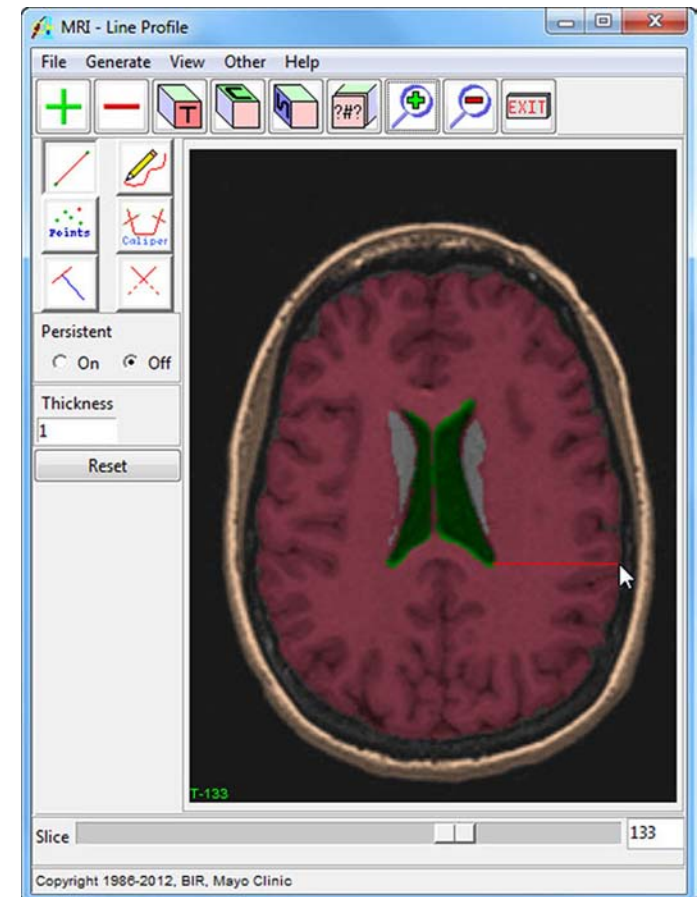
Line Profile

Object Map Support

- Line Profile now supports Object Maps, allowing objects to be viewed during line profile definitions.

Slice Slider in Main Interface

- Navigate through slices quickly using the new Slice slider at the bottom of the main Line Profile window.
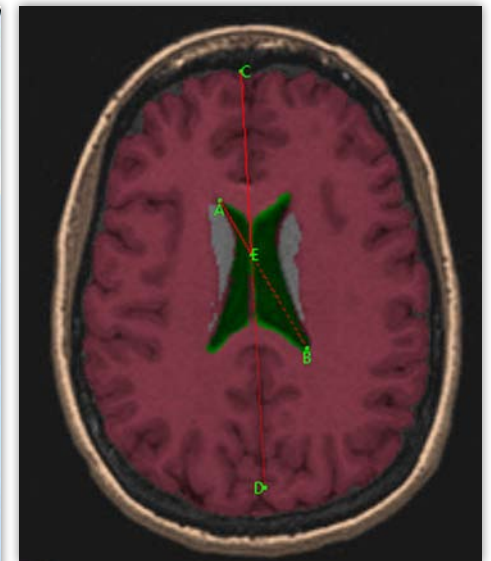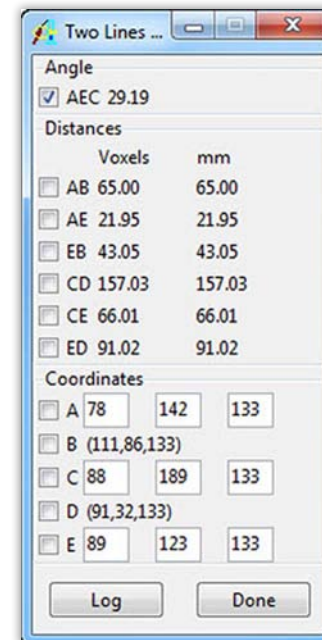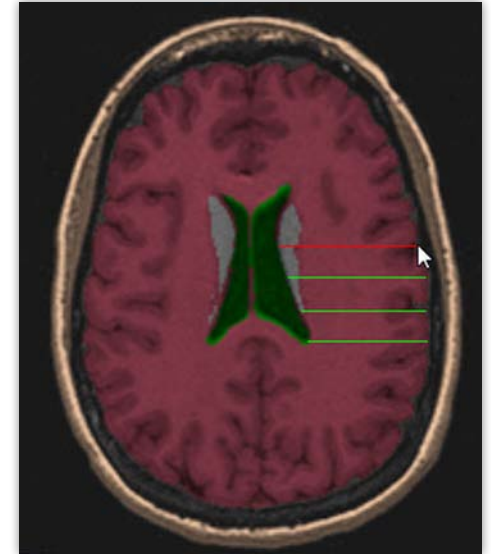
Line Profile

Log Profiles for Multiple Lines

- All lines defined with the "Persistent Lines" option can now be sampled on multiple slices.

  - Specify slices to sample using the Slice, Increment and Number controls in the Generate > Slice window.

  - Select the log files to create and start the sampling process from the Generate > Sequence window.
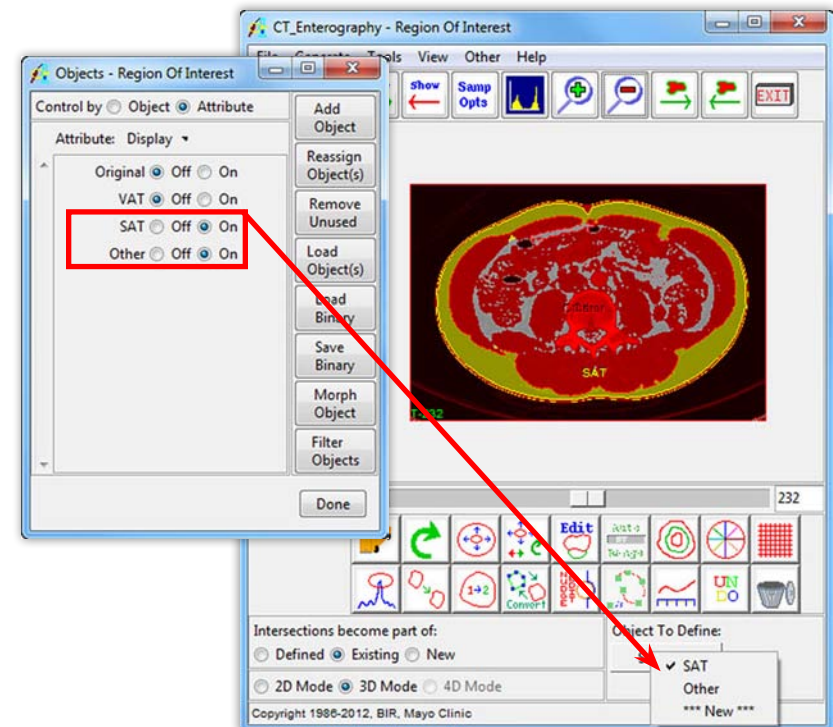

Coordinate Entry for "Two Lines" Points

- The "Two Lines" tool now allows the coordinates of points A, E, and C to be manually entered. This allows line segments to be positioned with greater precision, providing for more accurate angle and length measurements.
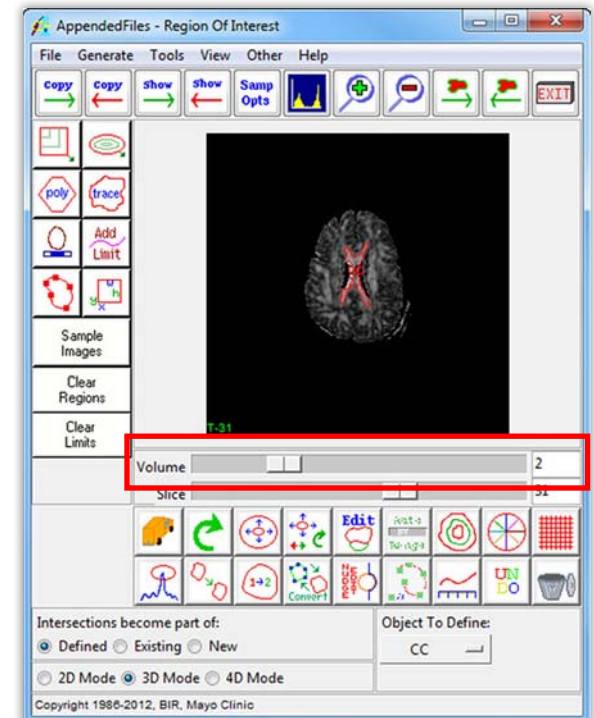
Region of Interest

"Object to Define" Menu Only Lists Objects with Display Enabled

- Only objects with the Display attribute turned On will be displayed in the "Object to Define" drop-down menu.

  - Prevents regions from being assigned to non-displayed objects.

  - Makes object selection easier when the object map contains a significant number of objects.

  - To turn the Display of an object on or off, go to View > Objects window.

Region of Interest

Volume Slider for Multivolumes

- When loading a 4D multivolume into the Region of Interest, a volume slider is now available below the image display.
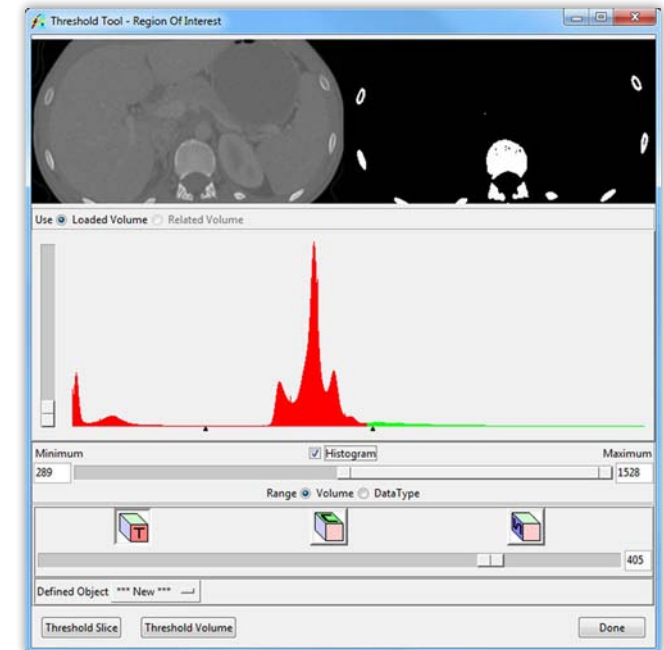

Log Names of 3D Volumes When Sampling an Appended 4D Multivolume

- When sampling a 4D multivolume that was created by appending 3D volumes in the Analyze workspace, the names of the original 3D volumes can be reported in the stats log file. This makes it easier to identify the volume associated with a particular set of statistics.

Region of Interest

Threshold Tool Histogram Display

- Display a image histogram within the Threshold Tool to help identify the appropriate thresholds for desired regions.

Capture Histogram Plots

- New "Save Histogram to Workspace" option allows a screenshot of the Histogram plot to be output to the Analyze workspace. The Save or Save As module can then be used to save this screenshot to disk in a common file formats like JPG, TIFF, or PNG.