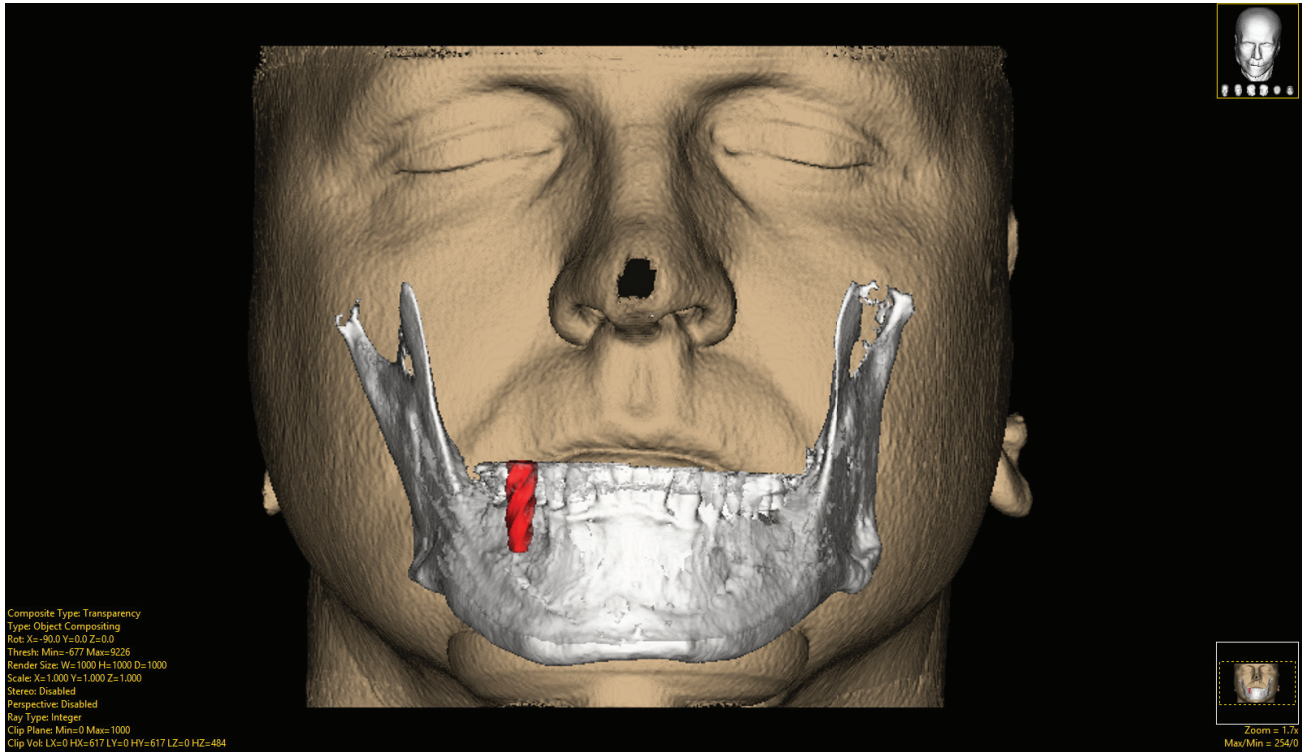
Display Rendering Types

Object Compositing

Object Compositing is available only when an object map is loaded with the data set. This rendering option produces 24-bit color renderings where the voxel mapping along each ray path is controlled by the Composite Type yellow text.



Composite Type: The following composite type options are available.

- Transparency - Opacity, Thickness and Color parameters for each object are used to determine the contribution of each visible object voxel along the ray path.
- Summed Object - The object color contributions for each visible voxel along the ray path are summed and then divided by the total.
- Maximum Object - The object which contributes the maximum number of voxels along each ray path is rendered.
- Maximum Contiguous Object - The object which contributes the longest contiguous span of voxels along each ray path is rendered.

Display Rendering Types

Object Compositing (continued)

Object Compositing Options: Surface Shading, Size Scaling, and Position Scaling options are available for certain composite types. These options are not available for Transparency. Size and Position Scaling are available for Maximum Contiguous Object methods.

- Surface Shading: Adds gradient-based surface shading to the output rendering when this option is enabled.
- Size Scaling: The count of voxels belonging to the rendered objects is used to weight the rendered contribution of that object along the ray. Larger counts will be brighter, fewer will be darker. This provides further visual information in the rendering with respect to the relative size of the object along the ray.
- Position Scaling: The output rendering weighted by the relative position of the first voxel rendered for the object along the ray path. This provides visual cues to show relative object position, with closer objects being brighter than those occuring later down the ray path.

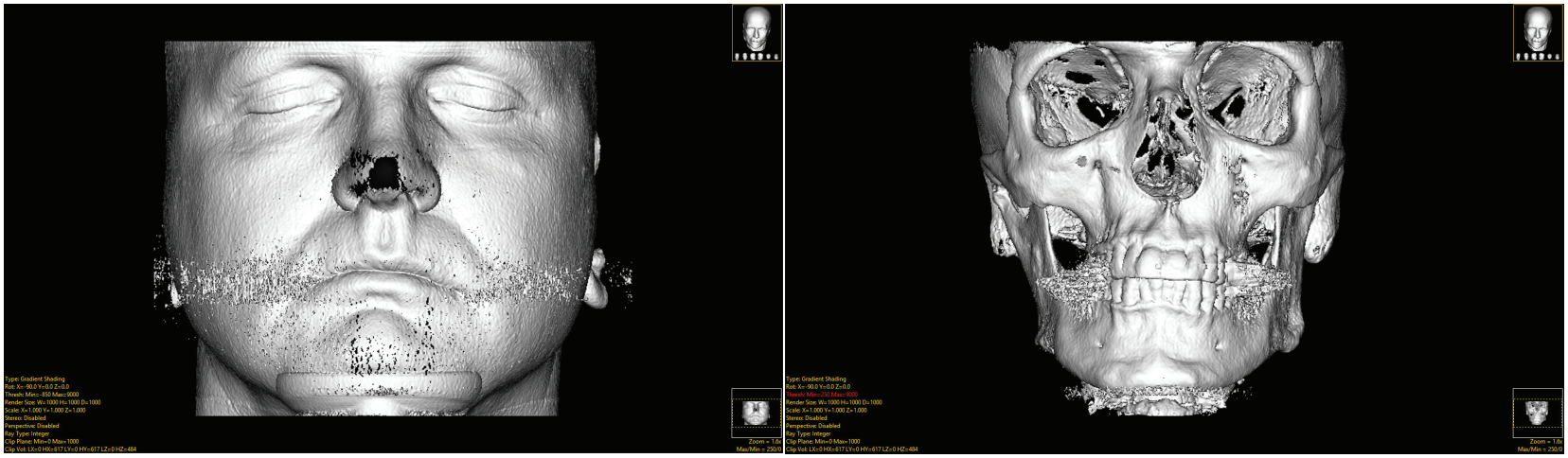
Composite Type	Surface Shading	Size Scaling	Position Scaling
Transparency			
Summed Object			
Maximum Object			
Maximum Contiguous Object			

Display Rendering Types

Object Compositing (continued)

Rot: Reports the current XYZ rotation angle coordinates. When selected, enables the rotate cursor. Right-click on the tool to choose from rotation default options; Front, Back, Left, Right, Top, Bottom and Angled.

Thresh: The Threshold option displays the current Threshold maximum and minimum values. Editing the threshold values can be useful to eliminate noise, airspace, or tissue when an object map has not been loaded.



- Clicking the yellow Thresh text will update the cursor to an up/down/left/right Threshold (TRESH) cursor. Hold down the left mouse button and slide the cursor forward to increase the minimum threshold value and backwards to decrease it. Slide the cursor right to increase the maximum threshold value and left to decrease the maximum threshold value.
- Double clicking the yellow Thresh text allows users to enter minimum and maximum threshold values.
- Right-click to specify Preset values or choose from Analyze Default, Calculated Max/Min, and DataType Max/Min.

Display Rendering Types

Object Compositing (continued)

Render Size: The Render Size option allows users to specify various rendering size attributes. The options include:

- Width: Specifies the display width for the rendered image.
- Height: Specifies the display height for the rendered image.
- Depth: Specifies the depth for the rendered image.

Right click options:

- Default: Sets the width and height to the largest input volume axis. Depth is set to the maximum diagonal (Square Root of the sum of the squares of each input axis).
- Maximum Diagonal: Sets the width, height and depth to the maximum diagonal.
- Double Diagonal: Sets the width, height and depth to double the diagonal size.
- Axial: Sets the width and height to the volume's width and height. The depth is set to the maximum width-depth or height-depth diagonal.
- Coronal: Sets the width and height to the volume's width and depth. The depth is set to the maximum width-height or height-depth diagonal.
- Sagittal: Sets the width and height to the volume's height and depth. The depth is set to the maximum width-height or width-depth diagonal.

Display Rendering Types

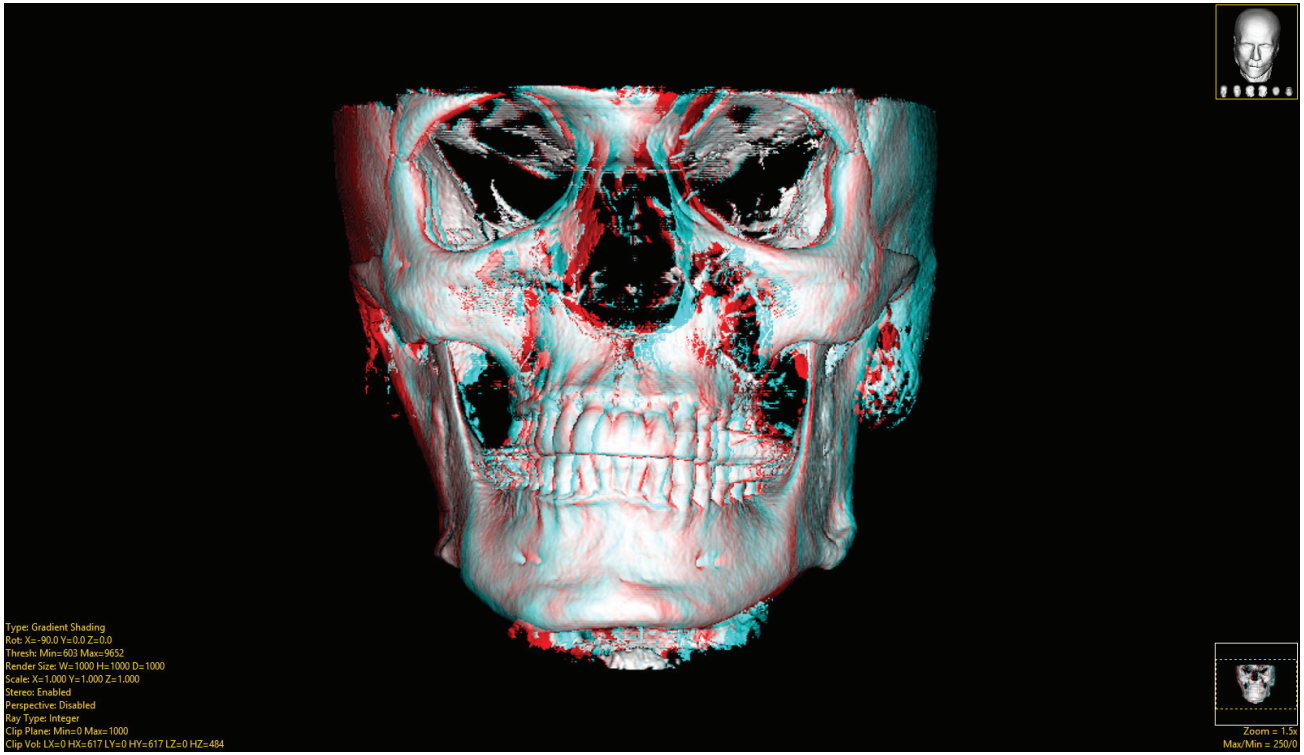
Object Compositing (continued)

Scale: Enables the specification of scaling factors to be applied to the inputs during the rendering process specifying the size of the rendered space. The following options are available:

- X: Specifies the X scale factor used to render the X axis, defining the render width.
- Y: Specifies the Y scale factor used to render the Y axis, defining the render depth.
- Z: Specifies the Z scale factor used to render the Z axis, defining the render height.

Stereo: The Stereo option allows users to generate stereo pairs of the current rendered image. To enable stereo pairs renderings, click on the yellow Stereo text or right click and check the Stereo option. The following right-click options are available:

- Red-Blue: Generates a rendering for use with "Red-Blue" glasses.
- Red-Green: Generates a rendering for use with "Red-Green" glasses.
- Red-Blue: Generates a rendering for use with "Red-Blue" glasses.



Display Rendering Types

Object Compositing (continued)

Stereo (continued)

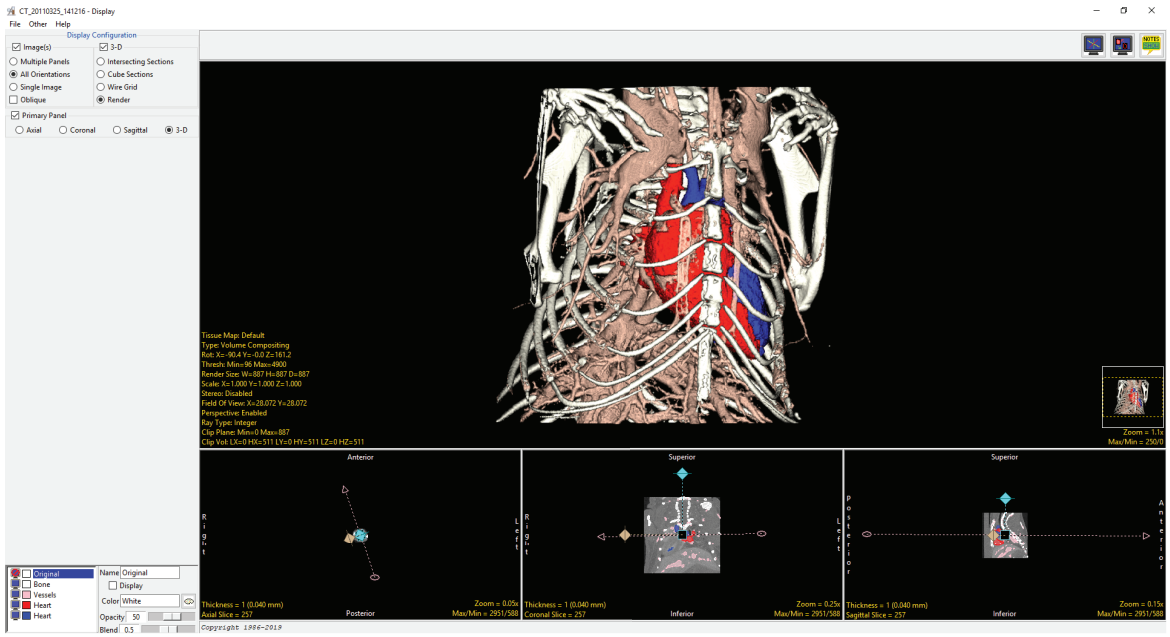
- Red-Green: Generates a rendering for use with "Red-Green" glasses.
- Cross Fusion: Generates a rendering for use without glasses. The viewer uses a technique of crossing their eyes, looking at the left image with the right eye and vice-versa.
- Interlaced: Generates a rendering where every other line comes from each view point. Viewing of this type usually requires an interlaced monitor and special glasses which trigger on each frames display.
- Disparity: Specifies the angle between the viewpoints. Half for each view point.
- Reverse Left/Right: When selected, swaps the viewpoints.
- Separation: Available only for Cross Fusion, this value specifies the number of voxels which separate the two centers of the two renderings.

Perspective: The Perspective rendering tool allows users to create perspective renderings of the image data based on eye/camera and look at viewpoints. The tool can also be used in conjunction with the Sequence tool to create fly-thru movies. Clicking on the yellow Perspective text enables Perspective rendering. See the Perspective tool for further information on perspective rendering and movie generation.

- Right Click Options
    - Perspective: Enable or disable perspective rendering.
    - Perspective Ray Type: Allows users to choose between a floating point or integer ray type for perspective rendering. See Ray Type for further information.

Display Rendering Types

Object Compositing (Continued)



Perspective (continued)

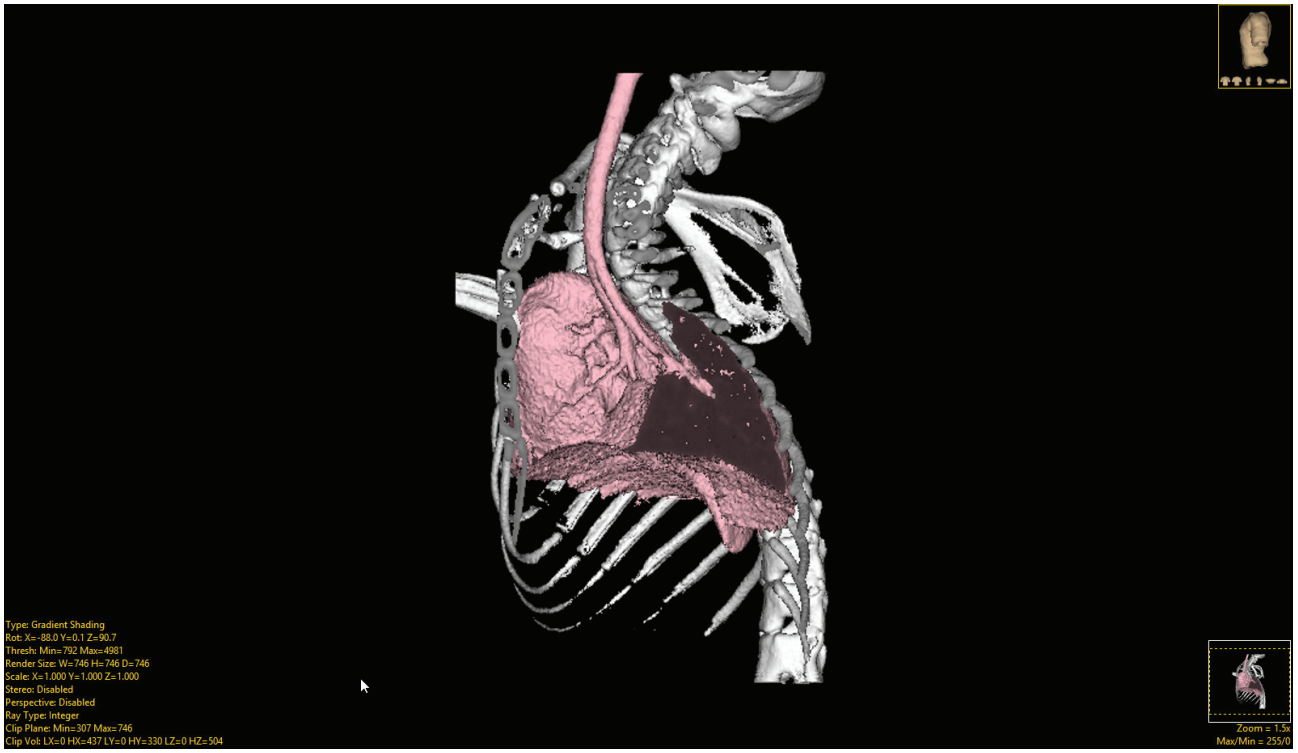
- **Field Of View:** The Field Of View (FOV) option allows users to specify the FOV for generating perspective renderings. Click the yellow Field Of View text and move the cursor right to increase the FOV, making the rendering appear smaller. Move the cursor left to decrease the FOV and the rendering appear larger. Double-clicking the yellow Field Of View text allows users to manually enter FOV parameters. Right-clicking on the Field Of View text provides access to the following options:
  - Maintain Aspect: The Maintain Aspect option allows users to disable and enable aspect maintenance. Disabling the Maintain Aspect option allows users to specify different X and Y FOV parameters, allowing for the creation of a non-proportional rendering.
  - Default: Sets the FOV to the default value, approximately a XY FOV value of 25.
  - Zoom In: When selected decreases FOV, approximately a XY FOV value of 12.5.
  - Zoom Out: When selected increases the FOV, approximately a XY FOV value of 50.
  - Zoom Way Out: When selected increases the FOV, approximately a XY FOV value of 70.

Display Rendering Types

Object Compositing (Continued)

Ray Type: The Ray Type option allows users to switch the ray indexing type from Integer to Float. Switching to float will improve rendering, however, the best results will typically be seen with anisotropic data.

Clip Plane: The Clip Plane tool allows users to specify the maximum and minimum depth along the ray between which voxels are processed for inclusion in the rendered image. Voxels outside the depth range are ignored.



Clicking on the yellow Clip Plane text will update the cursor to display a CLIP cursor. Hold down the left mouse button and slide the cursor upwards to increase the Minimum clip value, backwards to decrease the value. Slide the cursor left to decrease the Maximum clip value and right to increase the Maximum clip value. Double click on the Clip Plane text to manually enter the minimum and maximum clip values

Right click options:

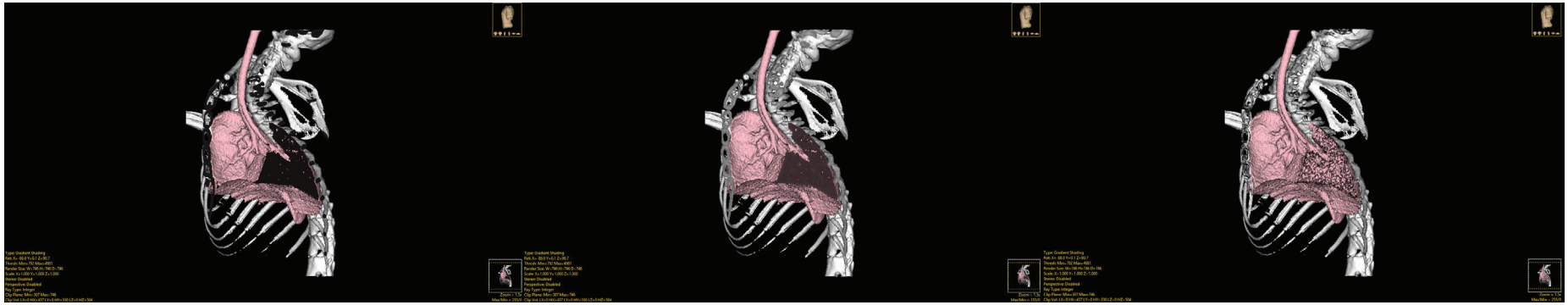
- Half way: When selected sets the minimum clip value to halfway through the data set.
- Reset: Resets the minimum and maximum clip values.

Display Rendering Types

Object Compositing (Continued)

Clip Plane Right Click Options (cont): Clip Shading: The Clip Shading option specifies the type of shading used, choose from:

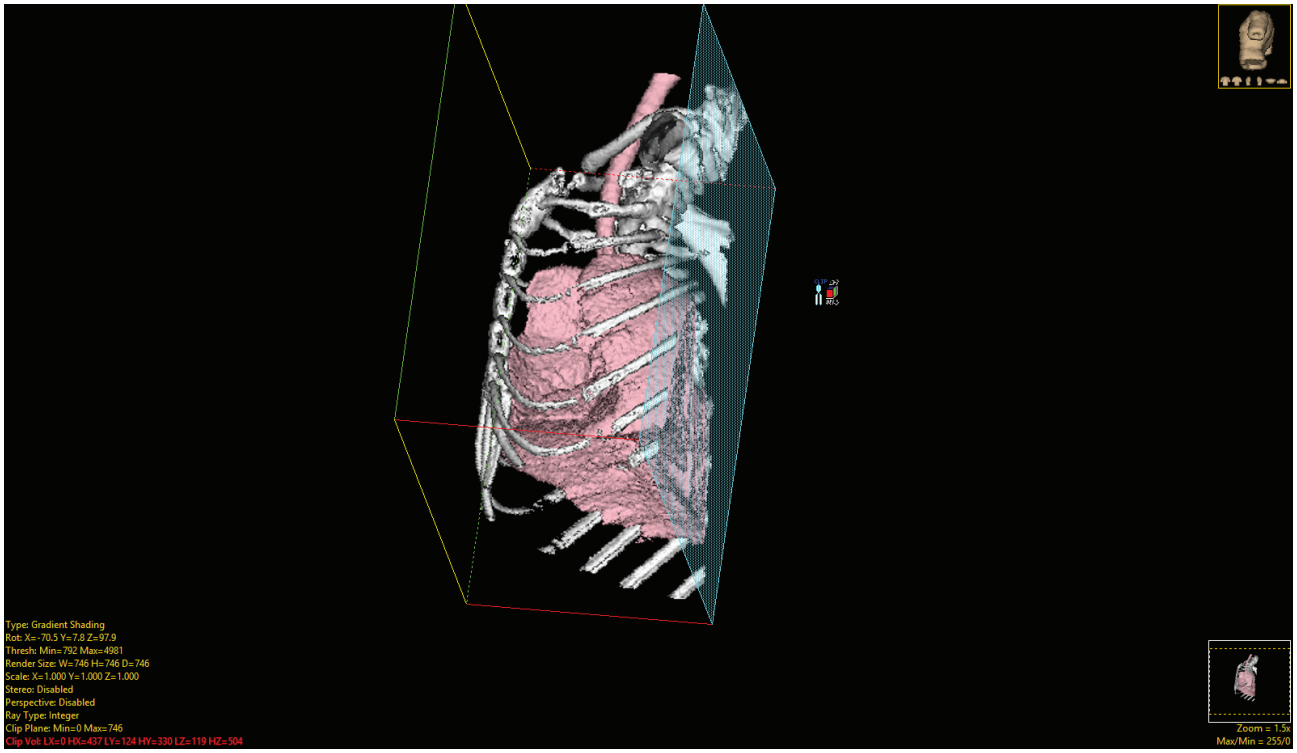
- Depth: Specifies that a value based only on depth is used to create the shaded pixel.
- Actual: Specifies that the gray scale value of the intersected voxel is used.
- Gradients: Specifies that the voxel along the ray path, just before the intersected voxel, is temporarily set to the input volume minimum intensity value and the gradient shading is calculated.



Display Rendering Types

Object Compositing (Continued)

Clip Vol: The Clip Volume tool allows users to specify a sub-volume of the data to be rendered based on the X, Y, Z coordinates of the volume. Clicking on the yellow Clip Vol text will update the cursor to display a CLIP cursor and volume edges will appear around the rendered image. Click on the volume edges to toggle through the planes to clip, choosing from Low X, High X, Low Y, High Y, Low Z and High Z.



Hold down the left mouse button and slide the cursor upwards to increase the plane value, backwards to decrease the value.

Double click the text to manually enter the volume sub-volume parameters:

- LX: Low X, specifies the low X value.
- HX: High X, specifies the high X value.
- LY: Lox Y, specifies the low Y value.

Display Rendering Types

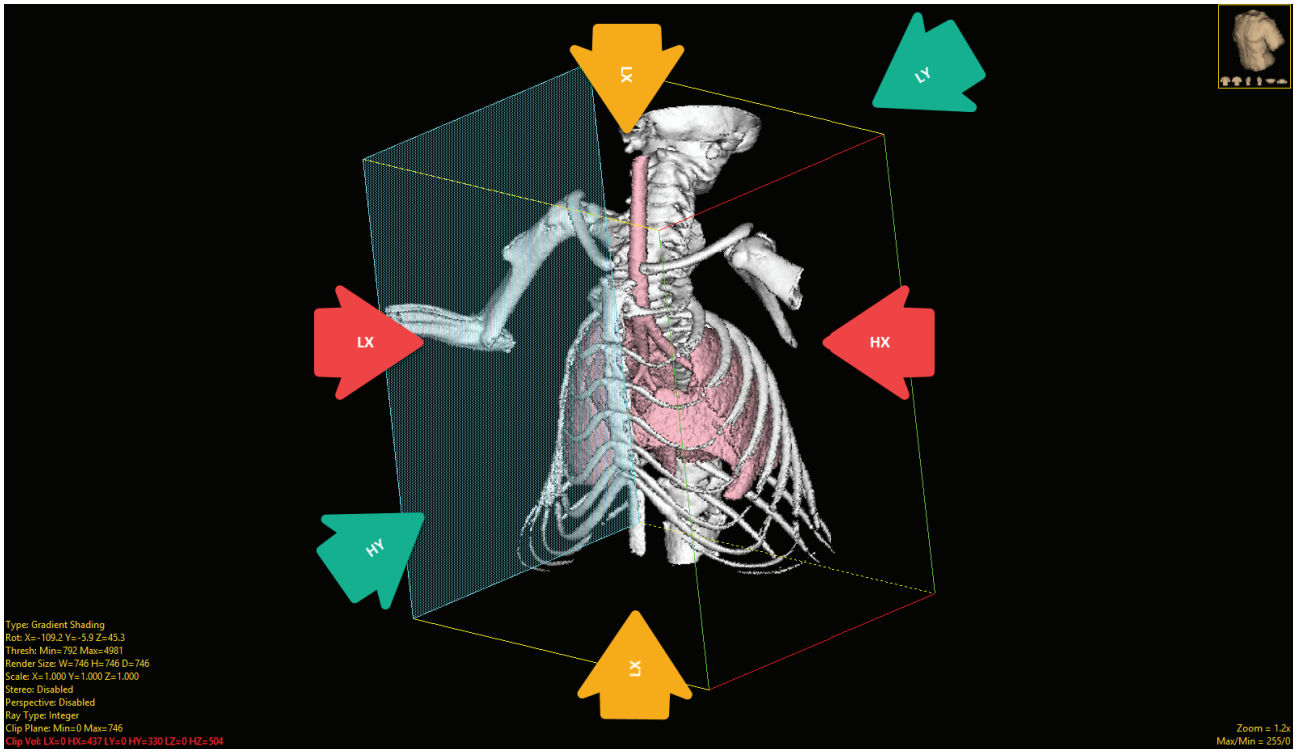
Object Compositing (Continued)

Clip Vol (continued):

- HY: High Y, specifies the high Y value.
- LZ: Low Z, specifies the low Z value.
- HZ: High Z, specifies the high Z value.

Clip Vol Right Click Options:

- Reset: Resets the minimum and maximum clip values.



- Clip Shading: The Clip Shading option specifies the type of shading used. Choose from the following options:
  - Depth: Specifies that a value based only on depth is used to create the shaded pixel.
  - Actual: Specifies that the gray scale value of the intersected voxel is used.
  - Gradients: Specifies that the voxel along the ray path, just before the intersected voxel, is temporarily set to the input volume minimum intensity value and the gradient shading is calculated.