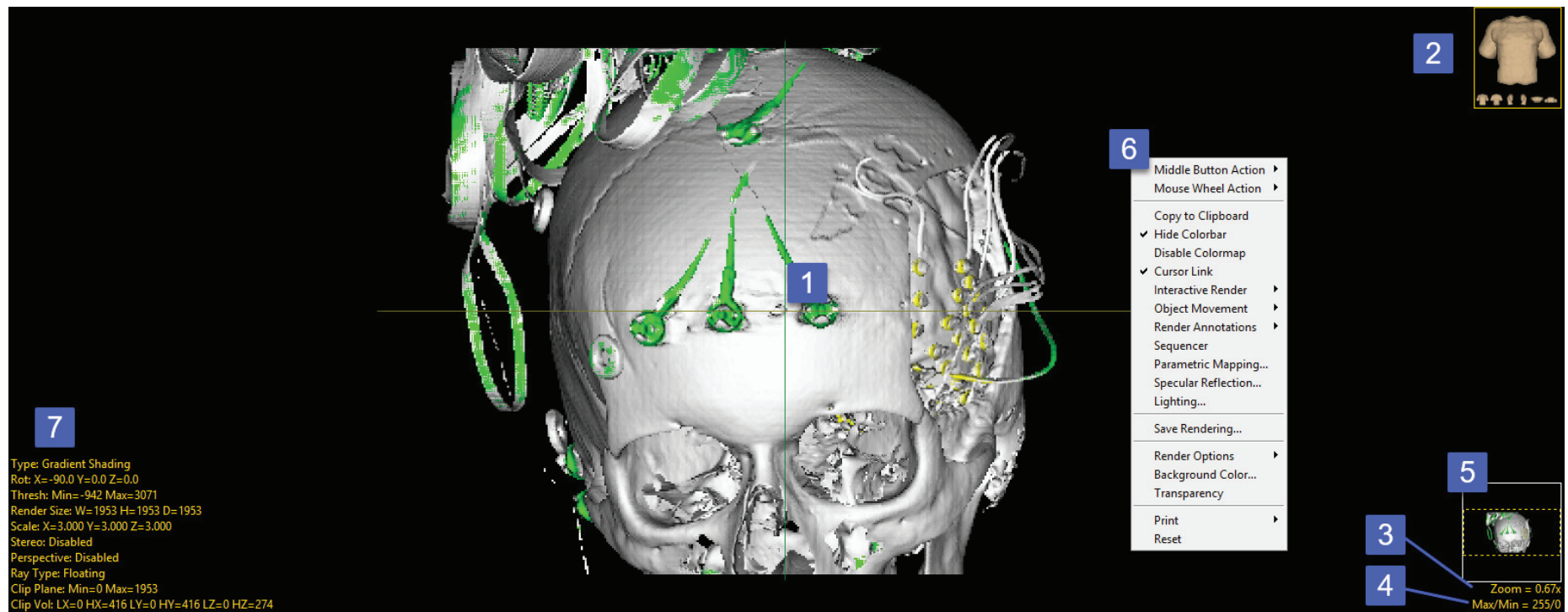# The Display Module Render Window

While the tools available for the slice and render display windows are covered in section 2. Image Display, Controls and Customization of this user's guide, the render window in Display has some additional features that are only available to users from the Display module. These features will be reviewed in more detail in this section of the guide.

The display module render window is comprised of several elements and tools: 1) the cursor link tool, 2) the navigation tool, 3) the zoom tool, 4) the pan tool, 5) the max/min intensity adjustment tools, 6) the right mouse menu options, and 7) additional rendering controls.

The Display Module Render Window (continued)

The Cursor Link: The cursor link allows users to interactively navigate through the image data. The tool is only enabled if the All Orientations, Single Image, or Oblique Image display configurations are enabled, otherwise to the Cursor Link tool is disabled. The Cursor Link tool can be controlled from the 3D rendering or from any of the 2D orientations. Moving the tool on the rendering will interactively update the orthogonal slice displays. The cursor linked can be enabled or disabled using the Toggle Cursor Link button.

The Navigation tool: The Navigation Icon is not just a reference for the current orientation of the 3D image data, the tool also allows users to rotate the data or specify a standard view; front, back, left, right, top, bottom. To rotate the data, left-click on the Navigation Icon and hold the left mouse button down. The cursor will update to the rotate cursor enabling interactive rotation of the rendering viewpoint. Releasing the left mouse button will dismiss the rotate cursor.

The Zoom tool: The Zoom tool in the Rendering Window allows users to increase and decrease the display size of the data. For more information refer to the Zoom tool description in section 2. Image Display, Controls and Customization.

The Pan tool: The Pan tool is automatically enabled when the Zoom size of the image is larger than the current window. Clicking in the tool allows users to Pan the zoomed area over the current display.

The Max/Min Intensity Adjustment tool: The Maximum and Minimum display intensities for the rendering can be changed by clicking on the yellow Max/Min Tool at the bottom right corner of the window. A cursor will return that allows the values to be manipulated. Hold down the left mouse button and move the mouse up/down or left/right.

Right Menu Options: Right-clicking in the Rendering Window reveals additional options. Most of these options, if available, are covered in the Slice Display section, however, there are few additional configuration options specific to the Rendering window.

- Middle Button Action: Allows action setting of the middle mouse button. See the Slice Display section for additional information.

- Mouse Wheel Action: Allows action setting of the middle mouse wheel. See the Slice Display section for additional information.

The Display Module Render Window (continued)
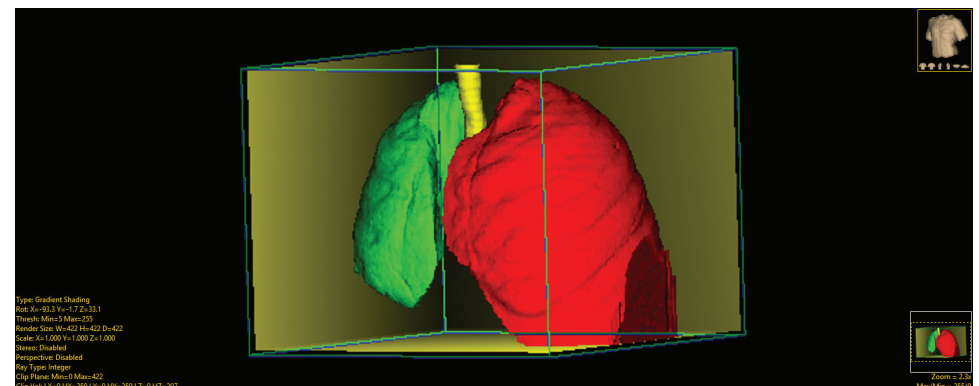
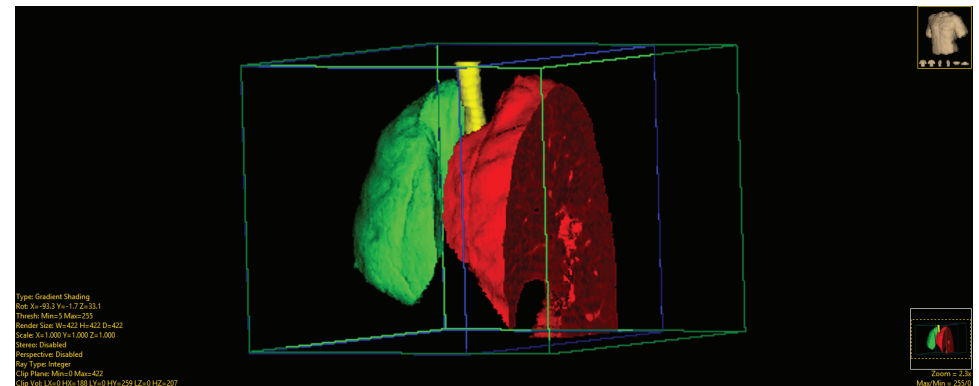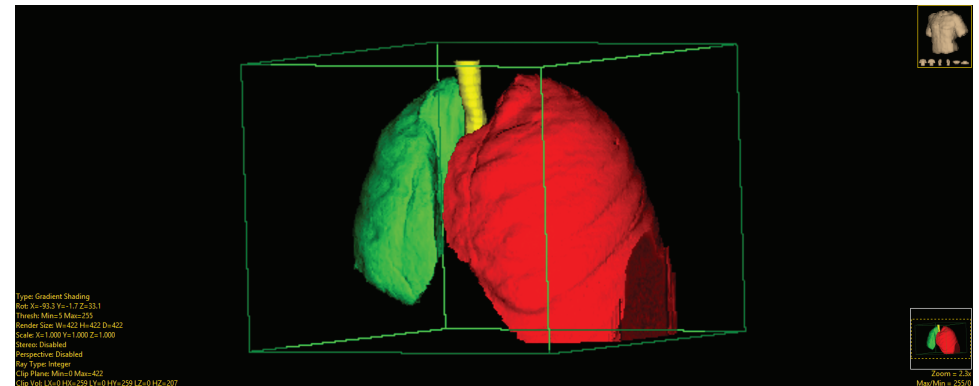**Right Menu Options (continued):**

- **Copy to Clipboard:** Copies the current rendering display to memory.

- **Hide Colorbar:** Allows users to hide or show the colorbar when available.

- **Disable Colormap:** Allows users to enable or disable the colormap when available.

- **Cursor Link:** Toggles the Cursor Link tool Off/On in the current display.

- **Interactive Render:** Allows users to selects between Reduced Quality (useful for interactive rotation of extremely large image volumes) and Full Quality.

- **Object Movement:** Object Movement allows users to manipulate the location of disabled objects.

  - Disabled – disable object movements.

  - Translation – allows X, Y, and Z translations to be applied to the selected object.

  - Rotation - allows X, Y, and Z rotations to be applied to the selected object.
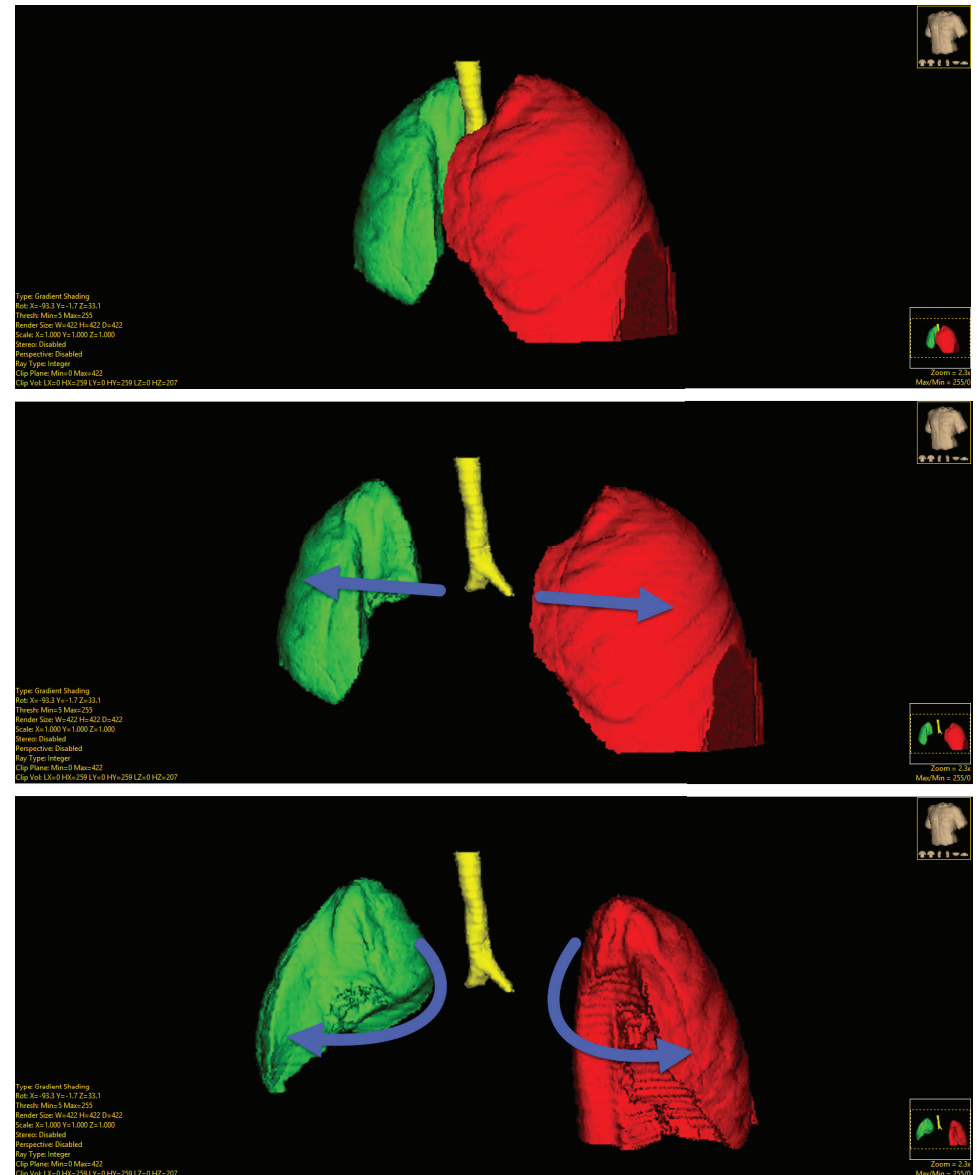
The Display Module Render Window (continued)

Right Menu Options (continued):

- Reset 'Object-x' Movements – rests all translations and rotations for the current object.

- Reset All Movements – rests all translations and rotations for all objects.

- **Render Annotations**

  - Volume Edges – when selected draws the volume edges on the rendered image.

  - Clips Edges - when selected draws the clip edges on the rendered image.

  - Back Drop - When selected displays a shaded backdrop in the rendered images.

  - Color – Allows users to change the color of the Volume Edges, Clip Edges, or Background Render Annotations, when enabled.

- **Sequencer** – allows users to enable the Sequencer tool for movie creation (see Sequencer for further information.)

The Display Module Render Window (continued)

Right Menu Options (continued):

- **Parametric Mapping** – Allows creation of renderings with related parametric maps. When the option is selected the Parametric Mapping window opens.

  - Workspace - allows users to select the workspace containing the related volume to be used for parametric mapping.

  - File - allows users to select the volume to be used for parametric mapping.

  - Enable Parametric Mapping: Toggles On and Off the mapping of the related volume on the rendered surface.
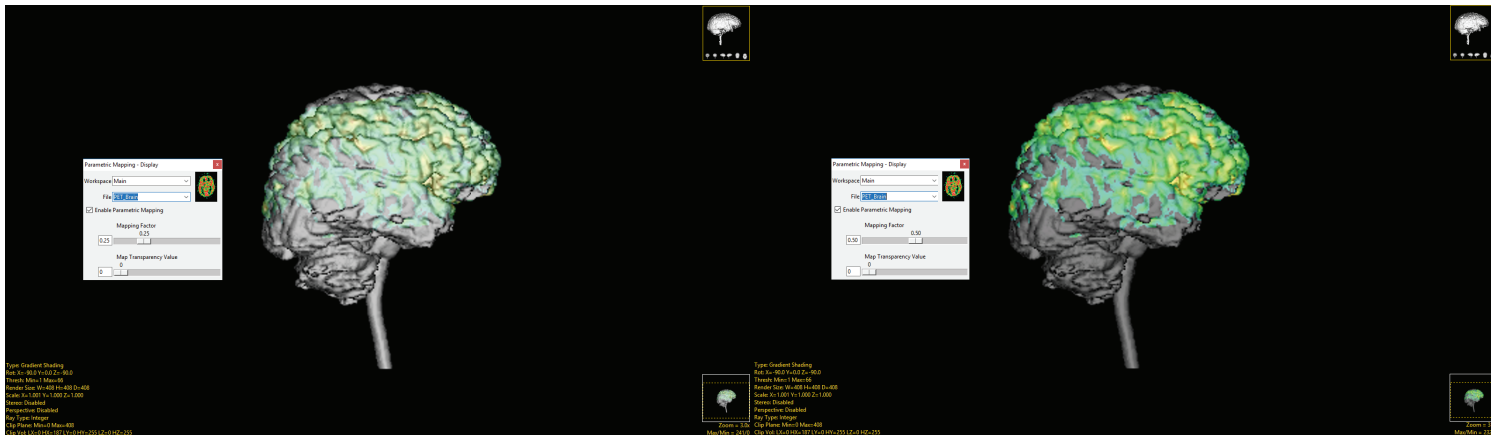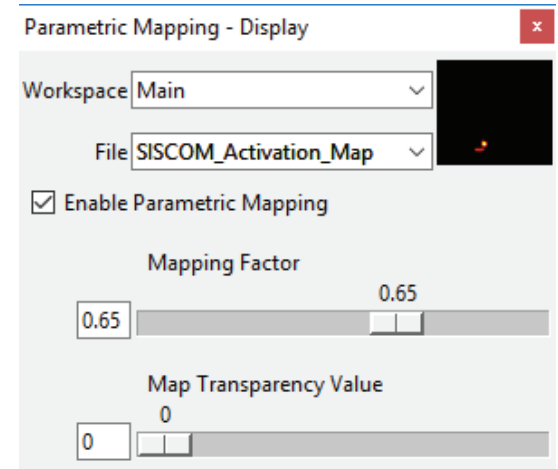
- Mapping Factor: Allows users to adjust the contribution of the related volume when combining the rendering of the input volumes. Increasing the mapping factor provides a clearer display of the related volume.

- Map Transparency Value: Allows users to adjust the transparency value of the related volume.

The Display Module Render Window (continued)

Right Menu Options (continued):

- **Specular Reflection:** The Specular Reflection rendering option is available for the Gradient Shading, Transparency and Volume Compositing render types. When the option is selected the Specular Reflection window opens.

  - Specular Reflection - Choose from Off or On to determine whether Specular Reflection is used to render the volume. Specular Reflection causes the highlights on the shiny surface (1).

  - Factor - Specifies the percentage of the shading that is done in Specular, 0.00 to 1.00. The rest of the shading is flat shaded.
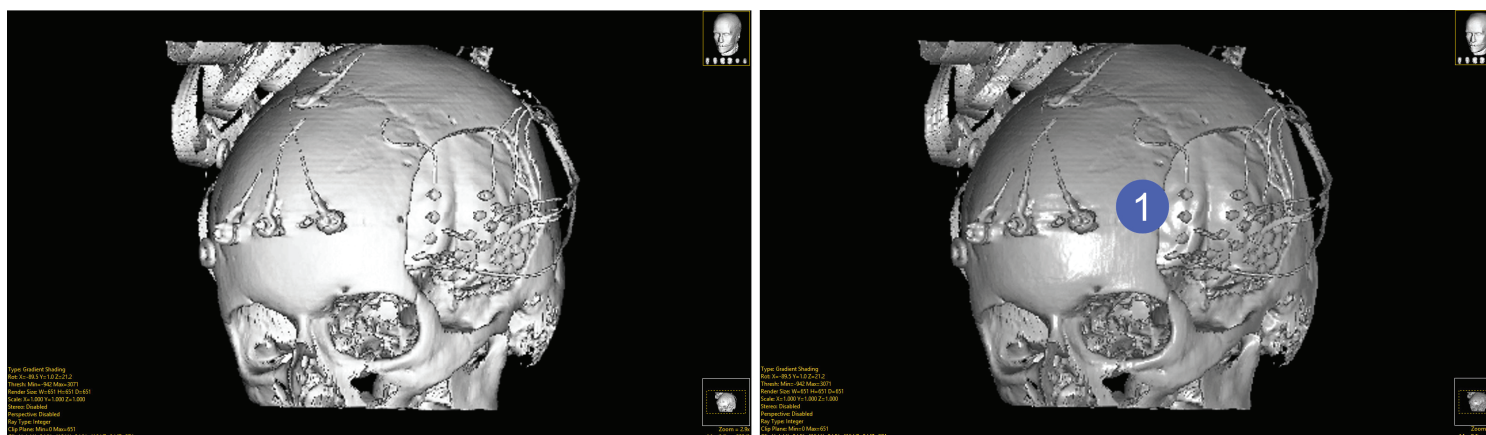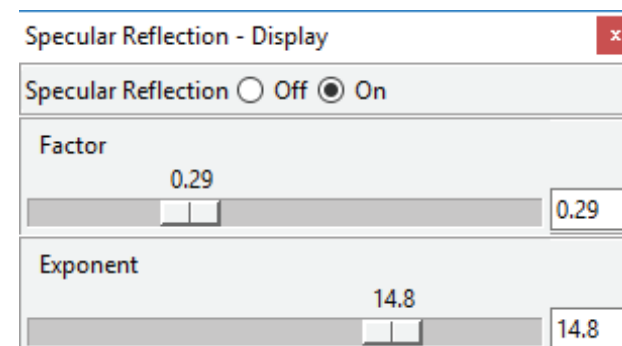

- Exponent - Controls the falloff rate of the shading. For example, a shiny surface has a high falloff rate, giving a small bright spot. A more diffuse surface, has a much lower falloff rate, and thus a lower exponent.

The Display Module Render Window (continued)

Right Menu Options (continued):

- **Lighting:** The Lighting options allows users to specifying the location of the light source used in reflective renderings. This option is available for the Gradient Shading, Transparency and Volume Compositing render types. When selected a Lighting window opens providing the following options:

  - Horizontal - Specifies the horizontal angle (azimuth) of the light source (in degrees) with respect to the viewpoint.

  - Vertical - Specifies the vertical angle (elevation) of the light source (in degrees) with respect to the viewpoint.

  - Brightness - – Specifies the brightness of the light source with respect to the viewpoint.

- **Save Rendering** – saves the current rendering to the Analyze workspace.

- **Render Options** – Allows users to enable/disable additional rendering options, these include:

  - Show Render Type - Allows users to view and change the rendering algorithm used to render the image data, choose from Depth Shading, Gradient Shading (default option), Volume Compositing, Maximum Intensity Projection, Summed Voxel Projection, Surface Projections, and Object Compositing. Double click on the Render Type option to cycle through the render types or right-click and choose a specific render type from the right mouse menu. For more information about render types and the render type specific options please refer to the 3D Rendering section of Display.

  - Show Rotation - 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, and Bottom.
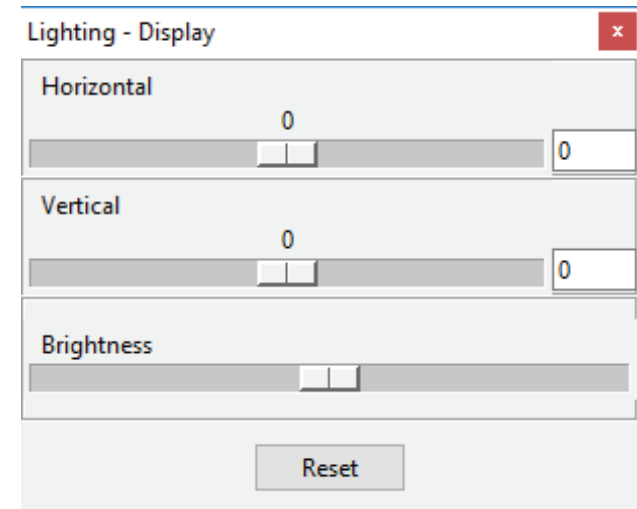
The Display Module Render Window (continued)

Right Menu Options (continued):

- Show Threshold: Displays the current Threshold maximum and minimum threshold values. Double clicking allows users to enter values. Right click to specify Preset values or choose from Analyze Default, Calculated Max/Min, and DataType Max/Min.

- Show Clip Plane: Enables the Clip Plane tool allowing users to specify the maximum and minimum depth along the ray path between which voxels are rendered. Clipping is particularly helpful when you need to observe the cross section of a 3D object.

- Show Clip Volume: Enables the Clip Volume tool, allowing users to clip the volume with six clip planes (X low, X high, Y low, Y high, Z low, and Z high).

- Show Render Size: Displays the current rendering size and allows the user to enter the rendering Width, Height, and Depth. Right click to choose from Default, Maximum Diagonal, Double Diagonal, Axial, Coronal, and Sagittal.

- **Background Color** – allows users to set the color of the rendering background. The option opens a Color selection window enabling selection of desired color.

- **Transparency** - The Transparency option turns transparent rendering on or off. The transparency rendering mode is useful for visualizing objects contained within objects or objects with views obscured by other objects. Object opacity levels can be set using the Opacity options in the Object Control window.

- **Background Opacity** - The Background Opacity option is only available when Transparency rendering is enabled. The option allows users to specify the background opacity for the transparency rendering.

- **Print** - Sends capture of current slice display to printer.

- **Reset** - Resets all options to default.