

# 3D View 3.2

## User Manual



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# Legal Notices

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# Regulatory Information

## Intended Use

3D View is software intended to be used for the visualization and analysis of MR and CT images of the heart and blood vessels. This includes:

- double oblique review of MR and CT Angiographic images,
- 3D review by means of MIP and volume rendering,
- 3D reformatting of MR and CT Angiographic images, and
- performing caliper measurements.

The measurements are based on contours that are manually drawn by the clinician or trained medical technician who is operating the software.


The analysis results obtained with 3D View are intended for use by cardiologists and radiologists to support clinical decisions concerning the heart and vessels.


## Indications for Use

3D View is indicated for use in clinical settings where more reproducible than manually derived quantified results are needed to support the visualization and analysis of MR and CT images of the heart and blood vessels for use on individual patients with cardiovascular disease.


When the quantified results provided by 3D View are used in a clinical setting on MR and CT images of an individual patient, they can be used to support the clinical decision making for the diagnosis of the patient. In this case, the results are explicitly not to be regarded as the sole, irrefutable basis for clinical diagnosis, and they are only intended for use by the responsible clinicians.

## Warning


 3D View must be used by cardiologists, radiologists, or trained technicians who are qualified to perform cardiac analysis. If the analysis results are used to reach a diagnosis, the results must be interpreted by a qualified medical professional. In clinical practice 3D View should not be used for purposes other than those indicated in the section Intended Use.

 Users must have sufficient proficiency in the English language, read this manual, become familiar with the software, and must be certified by Medis before using 3D View in a clinical environment in order to obtain reliable analysis results.

## Note on Monitor Aspect Ratio and Resolution

 The shapes of objects and calipers displayed may get slightly distorted when the resolution is set to an aspect ratio different than the monitor's physical aspect ratio. This distortion does **NOT** affect the accuracy of measurements or analyses. To avoid distortion, set the resolution of the monitor to an aspect ratio equal to the physical aspect ratio. LCD monitors typically operate best at their native resolution. Microsoft Windows recommends a resolution when it has sufficient information to do so.

## European Regulations

	3D View is qualified as a class IIa medical device. It complies with the requirements of the Dutch Medical Devices Decree (Besluit Medische Hulpmiddelen, Stb. 243/1995) and the European Medical Device Directive 93/42/EEC.
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## North American Regulations

3D View has been cleared for market in the United States by the FDA (Food and Drug Administration) under the provisions of Section 510(k) of the Food, Drug, and Cosmetic Act.

### Caution

Federal law restricts this device to sale by or on the order of a physician.

3D View complies with the requirements of the Canadian Medical Devices Regulations and has been licensed as a Class II medical device.

## South American Regulations

3D View complies with the requirements of the Brazilian National Health Surveillance Agency and has been licensed as a Class II medical device.

## Asia-Pacific Regulations

3D View complies with the requirements of the Australian Therapeutic Goods Administration and has been licensed as a Class IIa medical device.

3D View complies with the requirements of the Japanese Pharmaceutical and Medical Device Law and has been licensed as a Class II medical device.

3D View complies with the requirements of the South Korean Medical Device Act and has been licensed as a Class II medical device.

# Conventions Used

The following conventions are used throughout this manual to indicate mouse and keyboard actions and to refer to elements in the user interface.

## Mouse

Click	Press and release the primary mouse button. If you are left-handed, you may have set the right mouse button as your primary mouse button.
Click and drag	Press and hold the primary mouse button. Drag the mouse to perform a function. Release the primary mouse button. If you are left-handed, you may have set the right mouse button as your primary mouse button.
Right-click	Press and release the secondary mouse button. If you are left-handed, you may have set the left mouse button as your secondary mouse button.
Middle-click	Press and release the wheel button or the middle mouse button. If you have a two-button mouse, press and release the left and the right mouse button simultaneously.
Double-click	Press and release the primary mouse button twice.
Wheel	Rotate the mouse scroll wheel.

## Keyboard

SHIFT+click	Press and hold down the SHIFT key on your keyboard while you click a button or object.
CTRL+K	Press and hold down the CTRL key on your keyboard while you press K, then release both keys. This example shows or hides the axes.

## Typographical Conventions

On the <b>Annotations</b> node of the <b>Results</b> window...	Names of buttons, fields, menus, menu options, and tab names are capitalized and in bold.
<b>Results &gt; Text Annotation</b>	A sequence of menu options that you select to perform a specific task is indicated by angular brackets.
Label: Aortic root	Text that you type or that appears on the screen, such as annotation labels, is displayed in <code>Courier New</code> .

## Symbols Used



**Tip:** Provides helpful information or an alternative working method.



**Note:** Brings additional information to your attention.



**Caution:** Tells you to be careful when performing a task.



**Warning:** Warns you for a potentially dangerous situation in the image representation or analysis, which may lead to incorrect results. You are advised to follow the instructions to avoid this.



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## 1 About 3D View

3D View is the Medis software solution for the visualization of Computed Tomography Angiography (CTA) and Magnetic Resonance Angiography (MRA) images. It provides intuitive tools for manipulating CTA/MRA images, displaying CTA/MRA images in 2D and 3D, and provides tools for easy and quick measurements.

This software solution offers quantification results that enable interventional cardiologists and radiologists to review MR and CT angiograms, and it provides a solid basis for the assessment of new therapies.



3D View must be used by qualified medical personnel or trained technicians. If the analysis results are used to reach a diagnosis, the results must be interpreted by a qualified medical professional. 3D View should not be used for purposes other than those indicated in the section Intended Use and the section Indications for Use.

### 1.1 More Information


You can find background information in a number of additional documents. These are available in the `Documents` folder on the 3D View CD, and in the `Documents` folder in the 3D View installation directory on your system or network.

## 2 System Requirements

The system requirements can be found in the *Medis Suite* user manual.

## 3 Support

Medis is committed to offering high-quality products and services. If you have questions about the software, or if you would like to make suggestions for improvements in the software or in the documentation, please contact the Medis helpdesk.

If you contact the Medis helpdesk by e-mail, mention the name of the software and the version number in the subject field. To look up the version number of your software, select  > **About....**

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# Getting Started

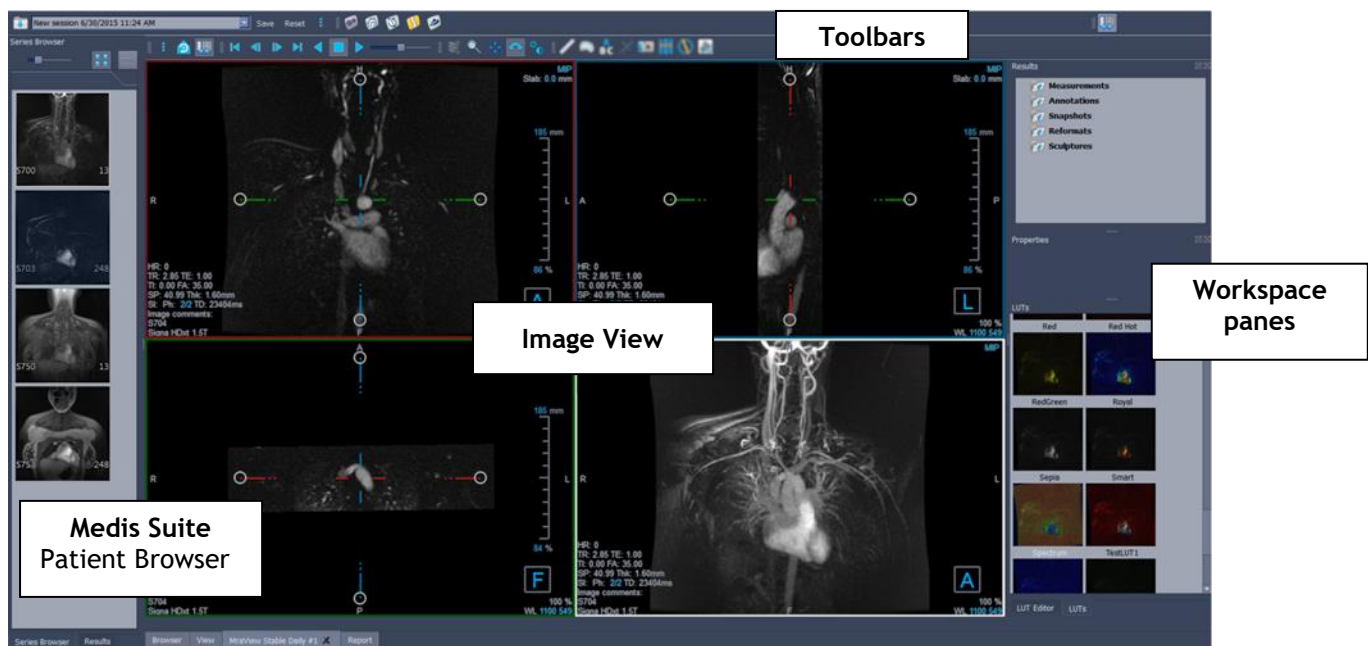
## 4 The 3D View Workspace

This chapter covers the following topics:

- overview
- toolbars
- workspace panes
- image view

### 4.1 Overview

The main workspace consists of toolbars, multiple workspace panes, and the image view.



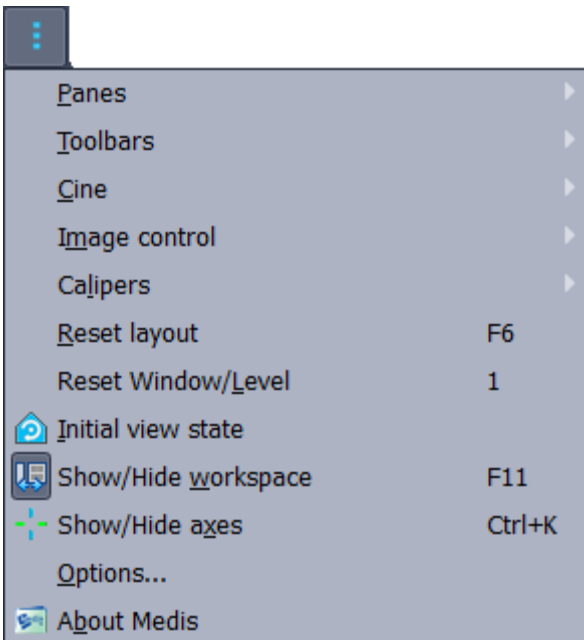
You can customize the main workspace by hiding or moving the workspace panes and toolbars. Any changes that you make to the main workspace are saved on a per user basis for future sessions.

### 4.2 Menu



The menu button contains all of the main functionality that you need when you are working with 3D View. These main commands are organized as follows: **Panes**, **Toolbars**, **Cine**, **Image Control** and **Calipers**. For some of these commands, tool buttons are available in the toolbars as shortcuts.

ⓘ Menu commands may be grayed out when you are performing a procedure, such as a radial reformat. You can make the menu commands active by canceling or finishing the procedure.

Menu item: View	Option	Description
	Panes >	Show / hide panes (patient, results)
	Toolbars >	Show / hide toolbars
	Cine >	Show different time points
	Image Control >	Zoom, panning, swivel and stacking.
	Calipers >	Add measurements, annotations, sculpture and reformats.
	Reset layout	Reset the window and toolbar layout
	Reset Window/Level	Reset the Window/Level
	Initial View State	Return to volume in original state
	Show/Hide Workspace	Show/hide workspace panes
	Show/Hide axes	Show/hide the axes
	Options...	Open dialog for general options
	About Medis	About box



## 4.3 Toolbars

The icons in the toolbars are shortcuts to frequently used menu options. You can make toolbars float and move them to another part of the main window. You can also show or hide toolbars.




### To make a toolbar float

- Click on the double-bar grip handle of the toolbar and drag it.

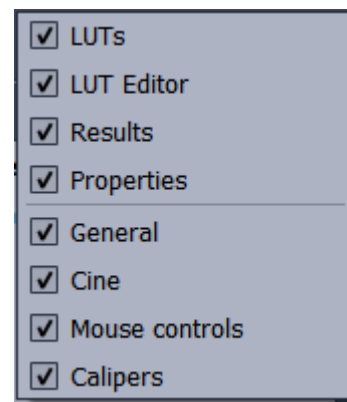
You can now move the toolbar to any location in the main window or outside of the application. Simply click and drag the toolbar to its new position. The position of the toolbar is saved for a next session when you close the application.

### To show or hide a toolbar

Select the toolbars menu by right clicking any space in the toolbar. This context menu will appear

















- Select the toolbar button  and **Toolbars**.
- Select a check box to show the toolbar, clear a check box to hide the toolbar.










Or,



- Right-click in the toolbar area. This opens a context menu.
- Select a check box to show the toolbar, clear a check box to hide the toolbar.

The state of the toolbars is saved on a per user basis for future sessions when you close the application.

Icon	Function
<b>General Toolbar</b>	
	Go to the initial view state
	Show or hide the workspace
	Show or hide the axes
<b>Movie Toolbar</b>	
	Go to the previous time point
	Go to the next time point
	Set to the first time point
	Set to the last time point
	Stop the movie
	Play the movie forward
	Play the movie backward
	Moderate the speed of the movie.
<b>Results Toolbar</b>	
	Create a distance measurement
	Create an area measurement
	Create an annotation
	Create a double distance measurement
	Create a snapshot

Icon	Function
	Create a reformat
	Create a radial reformat
	Create a sculpture
	Copy all measurement information to clipboard
<b>Image Control Toolbar</b>	
	Scroll through the images
	Zooming
	Panning
	Swivel
	Alter Window width and Window Level


## 4.4 Workspace Panes

By default, the workspace displays the following panes to the right of the image view.


- LUTs
- Results
- LUT Editor
- Properties

You can show or hide panes, make panes float, dock panes, combine panes into one tabbed panel and remove panes from a panel.

### To show or hide a pane

- Select the button  and choose **Panes**, and select a pane to show it. Clear its check box to hide it.

### To show or hide all panes

- Click  in the toolbar, or press F11 to show or hide all panes.

### To make a pane float

- Click and drag the title bar of the pane over the area of your screen to which you want to move it.

### To dock a pane

- Double-click the title bar to move a pane back to its original docked position.

Or,

1. Click and drag the title bar of the pane to the left or right side of the workspace as shown in the picture on page 4.
2. Move the pane up or down to select one of the anchor areas available.

As the pane approaches an anchor area, the area is highlighted with a dotted line. The pane can be combined with another pane or inserted separately.

3. When the anchor area of your choice appears highlighted, release the mouse button.

This moves the pane to the selected position.

### To combine panes into one tabbed panel

- Click and drag the title bar of the pane to the title bar of the pane with which you want to combine it.

This creates a panel. You can dock all panes into a panel.

### To remove panes from a panel

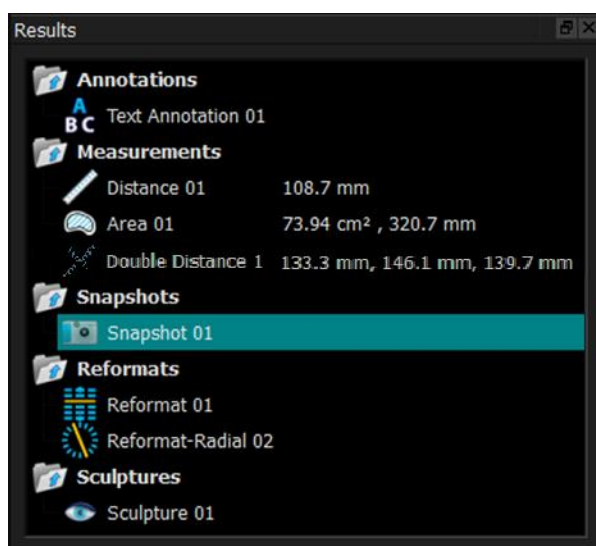
- Click and drag the title bar of the pane away from the panel.

### To reset the panel layout

- Select the button  and choose **View > Reset Layout** from the menu, or press F6.

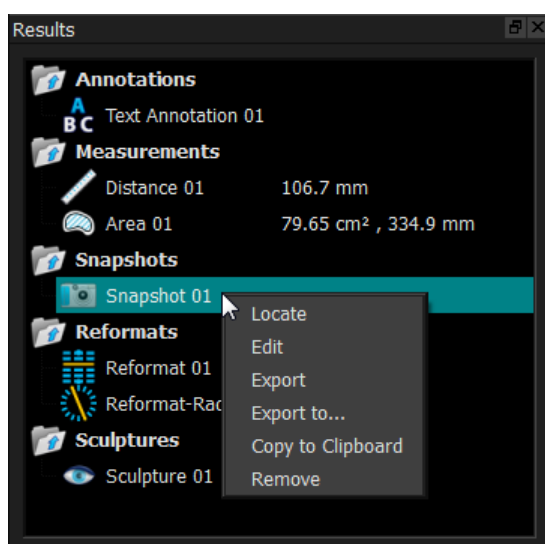
## 4.4.1 Results Pane

The Results pane lists the results of actions performed on the volume: annotations, measurements, snapshots, reformats and sculptures.



You can collapse and expand the branches of the tree by double-clicking the top-level nodes.

You can right-click a result to perform actions on the result. Depending on the type of result, you will get a context menu with several options.



**Locate:** The volume is rotated to the orientation at which the result was originally performed.


⚠ **Locate** may be grayed out. You can make this menu item active by canceling or finishing the active procedure.

**Edit:** The Properties pane is activated. You can modify the properties.

**Save:** The result is saved to the system. Results that are saved (as opposed to exported) can be loaded back into 3D View.

⚠ This option is only available for systems where 3D View is integrated.

**Export:** The result is exported to the system. Results that are exported (as opposed to saved) cannot be loaded back into 3D View.

 This option is only available for systems where 3D View is integrated.

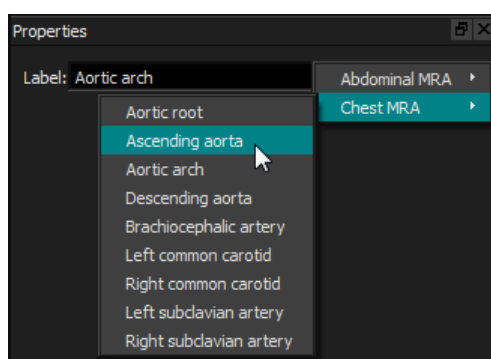
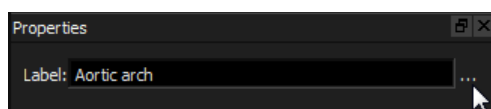
- Export to...:** You are prompted to select a file path, after which the snapshot is exported to disk.
- Copy to Clipboard:** The result label and value (if applicable) are copied to the clipboard.
- Remove:** The result is deleted.

## 4.4.2 Properties Pane

The Properties pane shows the properties of the selected result. You can always modify the Label, but you must activate a reformat or sculpture to view or modify their other properties.

### To modify a Label

1. On the Results pane, select the result.
2. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.



Or (annotations, measurements and snapshots only),

1. On the Results pane, right-click on the result and select **Edit**.
2. Select a predefined label, or type a custom label and press Enter.

### To modify the other properties of a reformat or sculpture

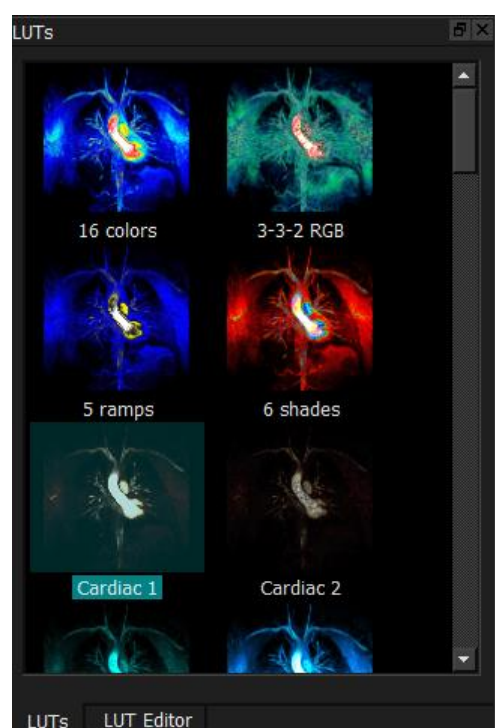
1. On the Results pane, right-click on the reformat or sculpture and select **Edit**.
2. On the Properties pane, modify the properties.

### 4.4.3 LUTs

LookUp Tables (LUTs) are used to enhance visualization in the 3DVR view. Rather than grey-scale values shown relative to a window and level, the grey-scale is mapped to a more general color scheme, which can help to visualize the data with the volume rendering (3DVR) view. For MR data, there is no canonical scale, and the LUT uses the window and level from the double oblique view as a default value. For CT data, Hounsfield units provide a canonical scale, and the LUT will use a predefined window and level, in Hounsfield units, if available.

#### 4.4.3.1 LUTs Pane

The LUTs pane displays the available LUTs as thumbnails of the volume rendering (3DVR) view. Use the LUTs pane to select another LUT to apply to the 3DVR view. If CT data is loaded, and one of the LUTs Cardiac 1-4 is selected, it will use a predefined window and level.



The LUTs pane has a context menu, which you can access by right-clicking on a thumbnail. From the context menu, you can set the selected LUT as the default, save the selected LUT with a new name, or, if the LUT is not one of the standard LUTs, delete the selected LUT.

#### To set the selected LUT as the default

- Right-click on the desired LUT and select **Set As Default**.

The default LUT is the LUT first used when 3D View starts.

#### To save the selected LUT with a new name

1. Right-click on the desired LUT and select **Save As...**
2. Type the name of the new LUT and click OK.

**To delete the selected LUT**

- Right-click on the desired LUT and select **Delete**.

Or,

- Click on the desired LUT and press the Delete key.

**4.4.3.2 LUT Editor Pane**

You can create a new LUT, or modify an existing one, on the LUT Editor pane.



❗ To aid in creating a LUT, a histogram is shown in grey in the chart on the LUT Editor pane. This indicates how many voxels in the original image occur for each grey-scale value. You may choose to display the grey values in a certain range with a specific color.

To create a LUT, you define any number of points, each with its own position, color and opacity.

**To create a new point**

- Click anywhere on the chart (except on a point).

**To delete a point**

- Click on the point and press the Delete key.

Or,

- Select the point, then right-click on the chart and select **Delete Active Point**.

**To change the color of a point**

- Click on the **Color** field to open the color picker.



The transition between neighboring colors is smoothed.

The position ranges from 0.0 to 1.0, and the opacity ranges from 0 to 100.

3D View is delivered with a set of predefined LUTs which may be modified, but not saved.

### To return a predefined LUT to its default settings

- Click the **Reset** button.

### To save a modified LUT with a new name

- Click the **Save As...** button.

ⓘ Changes to a predefined LUT are reverted with the **Save As...** action, and when 3D View is restarted.

### To save changes to a custom LUT

- Click the **Save** button.

ⓘ The **Save** button is only enabled once you have created your own LUT with **Save As...**, and then modified the custom LUT.

It is common to define a LUT with an ascending opacity, i.e. the larger the grey value, the larger the opacity.

### To reset the LUT to a ramp

- Right-click on the chart and select **Reset to Ramp**.

A LUT is created with two points with ascending opacity.

ⓘ The **Window** is the range of grey scales displayed. Voxels with grey scales outside that range are mapped to the nearest color in the LUT. The **Level** is the grey scale at the center of the **Window**. Thus, you can adjust the **Window** and **Level** to quickly include a select range of grey scale values.

ⓘ Saving a LUT while CT data is loaded will cause the current **Window** and **Level** to be saved. They will then be taken as the default values if the LUT is used with CT data in the future. If the LUT is used with MR data, it will simply reuse the current **Window** and **Level**.

## 4.5 Image View

The Image View displays the currently loaded volume 2x2 in several different representations.

By default, the images in the Image View display a number of patient details and volume information. You can show or hide these overlays from the image.

To show or hide the patient or volume information

- Select the button  and choose > **Options**, select **Hangings**, and select or deselect **Show patient information**.

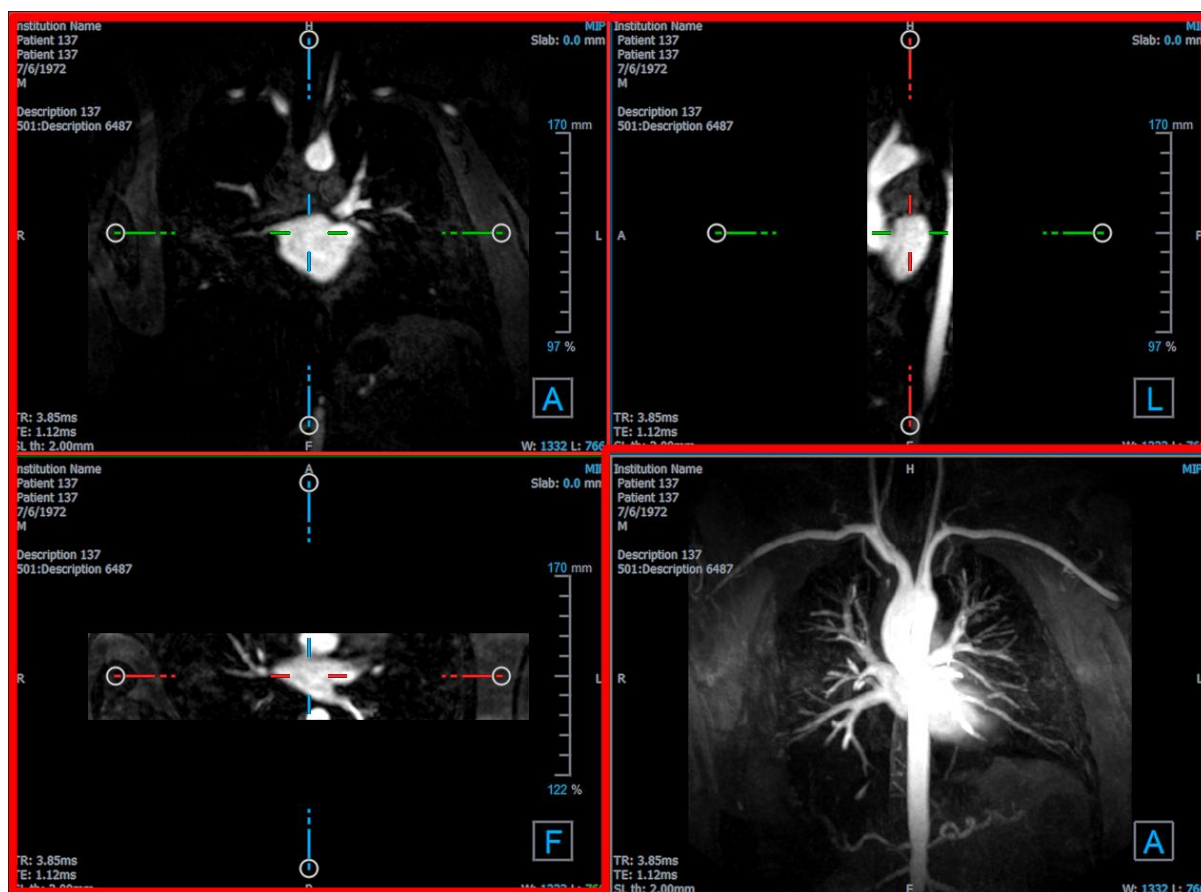
To temporarily hide all overlay graphics

- Hold down the ALT key and the right mouse button.

You can enlarge one of the viewports by double clicking on it.

### 4.5.1 Double-Oblique View

The three viewports highlighted below, collectively called the “double oblique” view (DOV), are always displayed. They show the volume from three perpendicular points of view.



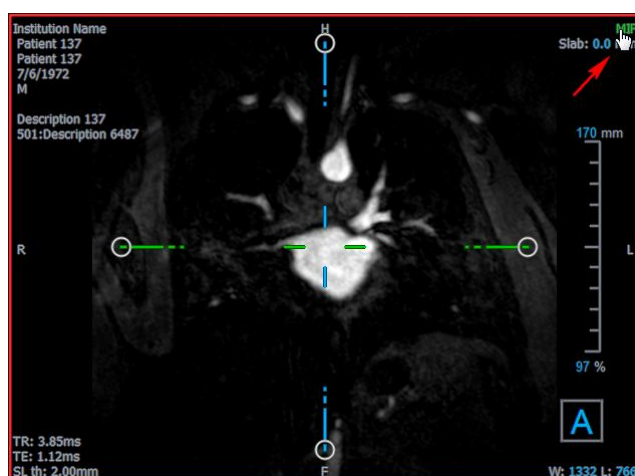
### 4.5.1.1 Slabs

Each double-oblique image is a maximum intensity projection (MIP), minimum intensity projection (MinIP) or Average image from a slice through the volume, called a slab. The slab thickness is displayed in the upper-right corner of each double-oblique viewport.

You can change the projection method performed on each slab among MIP, MinIP and Average. The MIP displays the maximum voxel value through the slab, the MinIP displays the minimum voxel value through the slab, and the Average displays the average voxel value through the slab.

#### To toggle among MIP, MinIP and Average

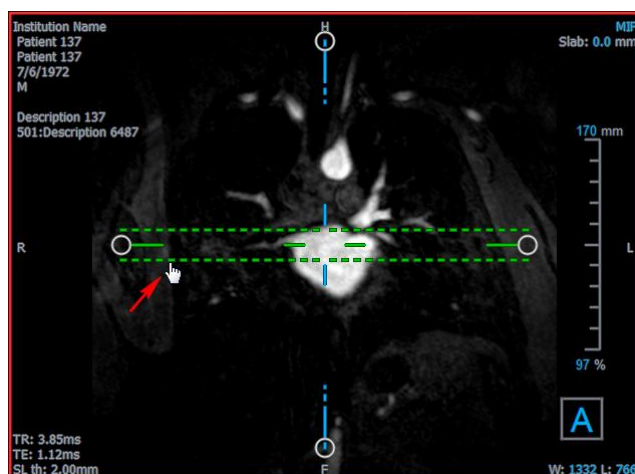
Click the overlay graphic in a double-oblique viewport.



You can change the thickness of the slab from which each double-oblique image is generated.

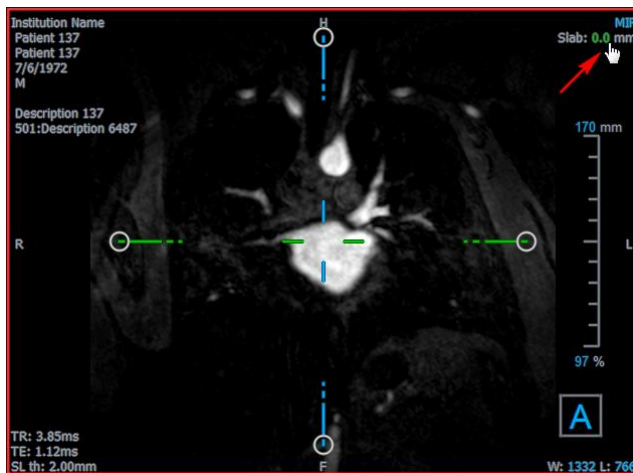
#### To change the double-oblique slab thickness

- Click the dashed segment of one axis and drag up or left to increase the slab thickness, or in the opposite direction to decrease the thickness.



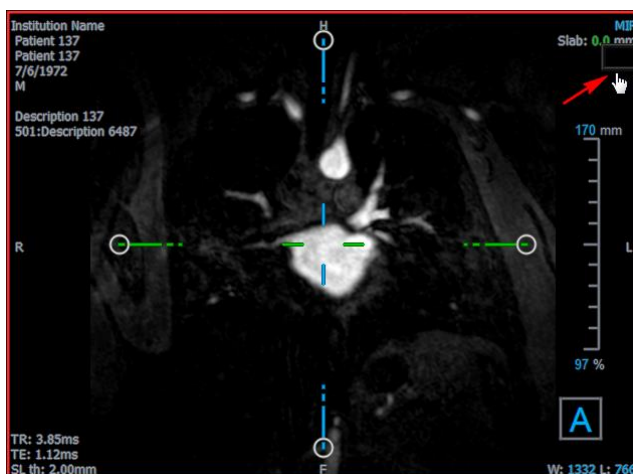
Or,

- Click the Slab interactive overlay graphics and drag up or down to increase or decrease the thickness.




Or,

- Right-click the Slab interactive overlay graphics and type a specific value into the entry field.



## 4.5.2MIP, 3DVR and Stack Views

You can toggle the lower-right viewport among several different representations. By default the maximum intensity projection (MIP) of the entire volume is displayed. You can change the lower-right viewport to the volume rendering (3DVR) view or, when a reformat has been performed, to the Stack view.

ⓘ The MIP and 3DVR views are enabled by default with the option,  and choose **> Options > Hangings > DoubleOblique > Enable hardware rendering**. If this option is unchecked, the MIP, 3DVR and LUT thumbnails will not be generated.

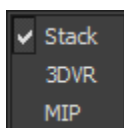
**To toggle among MIP, 3DVR and Stack views**

- Click the overlay graphic in the lower-right viewport.



Or,

- Right-click the overlay graphic in the lower-right viewport and select the view from the context menu.



Or,

1. Click the lower-right viewport to select it.
2. Successively press the space bar or the backspace key.

### 4.5.3 Multi-Time Point Image View

You can display images with multiple time points. When such an image is loaded, additional overlay graphics are displayed.





TP: The time point / Total number of time points


TD: Trigger delay

You can move forward or backward in time in several ways.

### To move forward or backward in time

- Click  or  on the Viewing toolbar to move to the previous or next time point.

Or,

- Activate the stacking tool  in the mouse controls toolbar and click and drag the mouse left and right to scroll through the time points.

Or,

- Press the left or right arrow key to move to the previous or next time point.

Or,

- Click the TP interactive graphics on one of the viewports to move to the next time point.

Or,

- Right-click the TP interactive graphics and enter the desired number of the time point.

Or,

- Select  and choose **Cine > Previous Time Point** or **View > Next Time Point**.

## 5 Image Navigation

This chapter describes how you can move around inside the volume to focus on what is most interesting.

To return the volume to its initial state


- Click  in the toolbar, or select  and choose **Initial View State**.

### 5.1 Double-Oblique View

The three viewports that make up the double-oblique view (DOV) show the volume from three perpendicular perspectives. Each perspective shows a slice at a specific depth with a certain thickness.



The orientation for each viewport is indicated by the orientation cube in the lower right. Rotating one viewport has the effect of moving a camera's perspective. As you rotate the volume, the orientation cube rotates, too. The letters on the cube indicate position:

	Anterior		Head		Left
	Posterior		Feet		Right

 Right-click on the orientation cube to select and rotate to one of the six primary orientations, the **Original** orientation produced while scanning, or **Reset** to the default orientation when 3D View first started.


The axes shown on each viewport also indicate orientation. Each color axis appears on two viewports, forming a plane: red, green and blue.

To show or hide the axes

- Click  in the toolbar, or press CTRL+K, or select  and choose **Show/Hide Axes** in the menu.

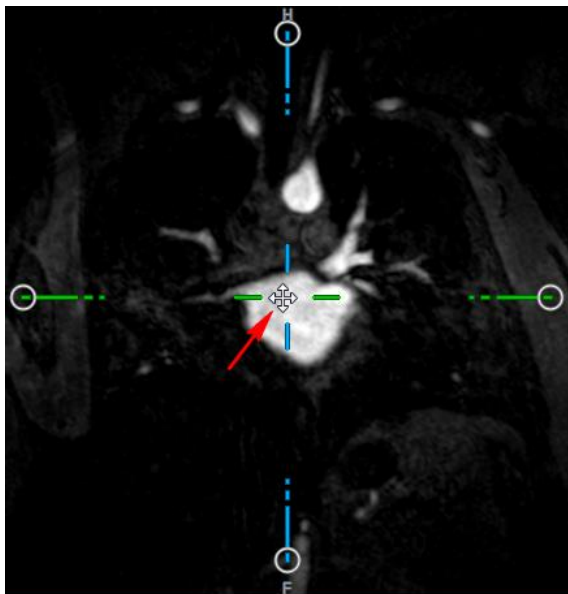
You can navigate through the volume in many different ways. The primary method of navigation is to click and drag the axes, or rotate the axes. The axes are re-centered in the viewport after translating them.

To center the image at a new location

1. Move the mouse to the axes center. The mouse cursor changes to the Move cursor .
2. Click and drag the axes to the desired location.




By default, the axes are re-centered in that viewport. To disable auto-centering, select **Options > Hangings > DoubleOblique**. Deselect **Enable auto center**.

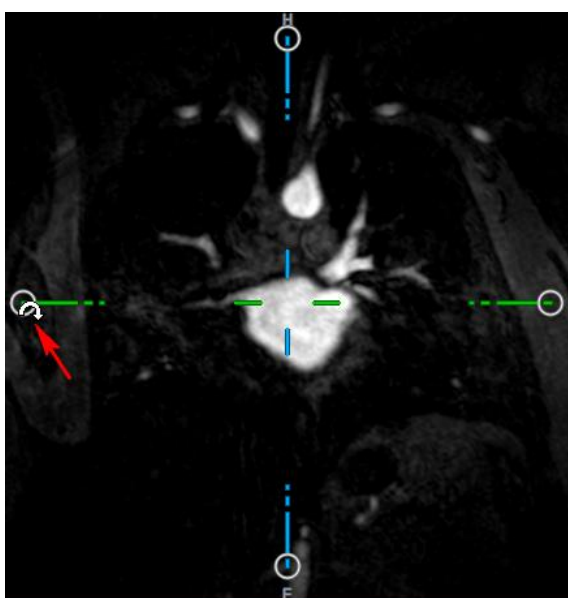


💡 To drag the axes vertically, press the Ctrl key after pressing the mouse key, then drag.

💡 To drag the axes horizontally, press the SHIFT key after pressing the mouse key, then drag.

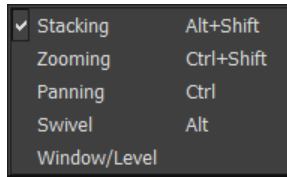
#### To rotate the image about the center of the axes



1. Move the mouse to a circular grip at the end of one axis. The mouse cursor changes to the Rotate cursor .
2. Click and drag the axes to the desired angle.






You can also select from one of several navigation methods on the left mouse button. Each method is available from the context menu of the double-oblique viewport. The selection in the context menu defines what the click-and-drag mouse function does.



 The default action of the left mouse button can be changed with the option  , select **Options > Hangings > DoubleOblique. Modify Left Mouse Button Default Action > DOV**.

### 5.1.1 Stacking

You can move into and out of the viewport slices using **Stacking** when you see the Stack cursor .

#### To move in and out

- Scroll the mouse wheel.

Or,

- Press and hold ALT+SHIFT, then click and drag the mouse up and down.

Or,

1. Select **Stacking** from the context menu.
2. Click and drag the mouse forward and backward to scroll through the slices.

With either technique, if scrolling reaches either end it will stop at the first or last slice.

### 5.1.2 Zooming

You can zoom in and out of the viewport using **Zooming** when you see the Magnify cursor .

#### To zoom in and out

- Press and hold the CTRL key while turning the mouse wheel.

Or,

- Press and hold SHIFT+CTRL, then click and drag the mouse up and down.

Or,

- Click and drag on the interactive labels of the scale overlay graphics.

Or,

- Click on the interactive labels of the scale overlay graphics to zoom in.

Right-click on the interactive labels to zoom out.


Or,

1. Select **Zooming** from the context menu.
2. Click and drag the mouse forward and backward to zoom in and out.



The current zoom factor is displayed on the scale overlay graphics in each viewport. The value above the scale is the physical size of the scale. The number below the scale indicates the relative zoom: 100% means one display pixel equals one acquisition voxel.

### 5.1.3 Panning

You can move the image within the viewport left, right, up and down using **Panning** when you see the Hand cursor .

**To pan the image**

- Press and hold the CTRL key, then click and drag the mouse in any direction.

Or,

- Middle-click and drag the mouse in any direction.

Or,

1. Select **Panning** from the context menu.
2. Click and drag the mouse in any direction.

### 5.1.4 Swivel

You can rotate the volume about the axes using **Swivel** when you see the Rotate cursor .

**To swivel about an axis**


- Press and hold the ALT key, then click and drag the mouse in any direction.

Or,

1. Select **Swivel** from the context menu.
2. Click and drag the mouse in any direction.

The volume rotates around the axis (red, green or blue) perpendicular to the direction of mouse movement.

## 5.1.5 Window Width and Level

You can adjust the window width and level (WWL) when you see the WWL cursor .

### To adjust the window width and level

- Right-click and drag
  - Right or left to increase or decrease the width.
  - Up or down to increase or decrease the level.

Or,


- Click on the window width or level interactive graphics and drag up or down to increase or decrease the window width or level.

Or,

- Right-click on the window width or level interactive graphics and enter the desired values.

Or,

1. Select **Window/Level** from the context menu
2. Click and drag
  - Right or left to increase or decrease the width.
  - Up or down to increase or decrease the level.


 The current window width and level are displayed in the lower-right overlay graphics in each viewport.

### To reset the window width and level

- Press the 1 key.

Or,


- Click the middle mouse button on the window width and level interactive graphics.

 Different window width and level values are maintained for the double-oblique view, MIP view and 3DVR view.

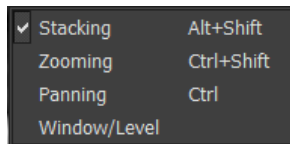
## 5.2 MIP, 3DVR and Stack Views

You can view the maximum intensity projection (MIP), volume rendering (3DVR) and Stack views in the lower-right viewport as explained in section 4.5.2.

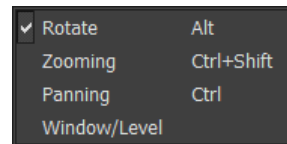


The MIP and 3DVR views are enabled by default with the  and **Options > Hangings > DoubleOblique > Enable hardware rendering**. If this option is unchecked, the MIP, 3DVR and LUT thumbnails will not be generated.

You can select from one of several navigation methods on the left mouse button. Each method is available from the context menu of the lower-right viewport. The selection in the context menu defines what the click and drag mouse function does.




Stack




MIP and 3DVR



The default action of the left mouse button can be changed with the option  and **Options > Hangings > DoubleOblique > Left Mouse Button Default Action > Stack or MIP and VR**.

### 5.2.1 Rotate

You can rotate the volume rendering in 3D space using **Rotate** when you see the Rotate cursor .

#### To rotate

- Press and hold the ALT key, then click and drag the mouse in any direction.

Or,

1. Select **Rotate** from the context menu.
2. Click and drag the mouse in any direction.

The volume rotates around the axis perpendicular to the direction of mouse movement.

### 5.2.2 Zooming

You can zoom in and out of the viewport using **Zooming** when you see the Magnify cursor .

#### To zoom in and out

- Press and hold the CTRL key while turning the mouse wheel.

Or,

- Press and hold SHIFT+CTRL, then click and drag the mouse up and down.

Or,

- (Stack only) Click and drag on the interactive labels of the scale overlay graphics.

Or,

- (Stack only) Click on the interactive labels of the scale overlay graphics to zoom in.  
Right-click on the interactive labels to zoom out.

Or,

3. Select **Zooming** from the context menu.
4. Click and drag the mouse forward and backward to zoom in and out.




The current zoom factor is displayed on the scale overlay graphics in the Stack viewport. The value above the scale is the physical size of the scale. The number below the scale indicates the relative zoom: 100% means one vertical display pixel equals one acquisition voxel.



You can reset the zoom factor to 100% by clicking the middle mouse button over the zoom interactive graphics.

### 5.2.3 Panning

You can move the image within the viewport left, right, up and down using **Panning** when you see the Hand cursor .

#### To pan the image

- Press and hold the CTRL key, then click and drag the mouse in any direction.


Or,

- Middle-click and drag the mouse in any direction.

Or,

1. Select **Panning** from the context menu.
2. Click and drag the mouse in any direction.

### 5.2.4 Window Width and Level

You can adjust the window width and level (WWL) in two ways when you see the WWL cursor .

#### To adjust the window width and level

- Right-click and drag
  - Right or left to increase or decrease the width.
  - Up or down to increase or decrease the level.

Or,

1. Select **Window/Level** from the context menu
2. Click and drag
  - Right or left to increase or decrease the width.
  - Up or down to increase or decrease the level.



The current window width and level are displayed in the lower-right overlay graphics.



The 3DVR window width and level can also be adjusted on the LUT Editor.



You can reset the window width and level by pressing the 1 key.



Different window width and level values are maintained for the double-oblique view, MIP view and 3DVR view.

# Working with 3D View

## 6 Results


Results are the work products that you can produce with 3D View. In this application the results you can create include:

- Annotations,
- Distance measurements,
- Area measurements,
- Double distance measurements,
- Snapshots,
- Sculptures to remove extraneous information,
- Reformats in a rectangular format,
- Reformats in a radial format, and
- You can save all the results by various means.

3D View is delivered with a default set of predefined result labels. The predefined labels can be modified in the file 3D ViewProcedureLabels.xml found in your application data folder.

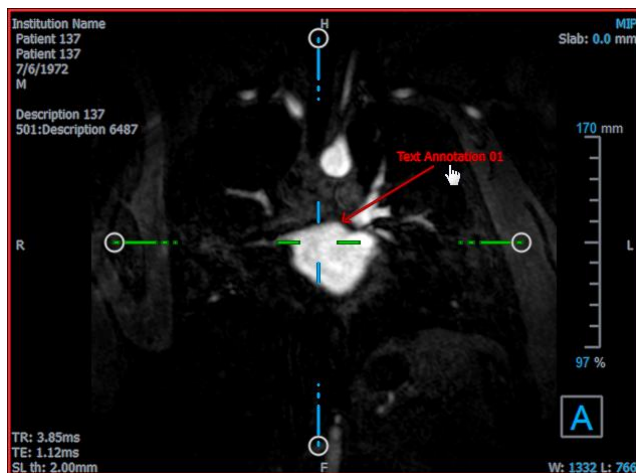
### 6.1 Annotations

This chapter covers adding, editing and deleting annotations.

You can change the default text label, graphics color, and arrowhead style by selecting  and **Options > Results > Text annotation**. The new graphics color and arrowhead style are applied to existing annotations.

#### 6.1.1 Adding Annotations


You can add annotations to a viewport to mark it for analysis or to draw attention to specific details. Annotations are displayed in the Image View, and listed on the Results pane.





When you navigate to another location in the volume, your annotation may not be displayed on the double-oblique viewport. This is because the point to which the annotation refers does not lie on the currently visible slice. To see your annotation again, right-click on the annotation on the Results pane and select **Locate**; or double click on the annotation on the Results pane.

### To add an annotation

1. Click  in the toolbar, or select **Results > Text Annotation** in the menu.
2. Click and drag in the image to draw the arrow.
3. Select a predefined label, or type a custom label and press Enter.
4. Click and drag the arrowhead or the text to adjust the exact location of the image that you want to mark.
5. Click outside the annotation. The graphic changes to white indicating it has left edit mode.

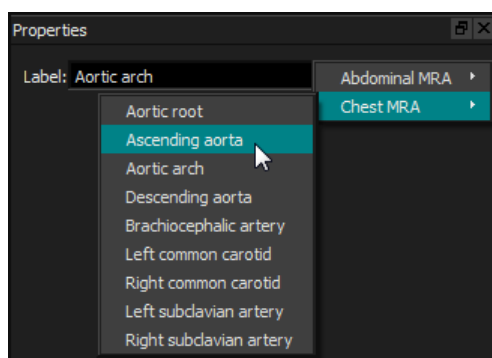
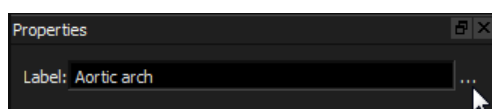
This adds the annotation to the Annotations list in the Results pane. At any time while the annotation is still active you can press Esc to remove the annotation.

## 6.1.2 Editing Annotations

You can modify the text and location of annotations that were added previously.

### To edit annotation text

1. On the Results pane, select the result.
2. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.



Or,

1. On the Results pane, right-click on the result and select **Edit**.
2. Select a predefined label, or type a custom label and press Enter.



#### To edit the annotation location

1. Click the annotation graphic.
2. Click and drag the arrowhead or the text to adjust the exact location of the image that you want to mark.

### 6.1.3 Deleting Annotations

You can delete any annotation that was added to a viewport.

#### To delete an annotation

- Click the annotation graphic and press Delete.

Or,

1. Select the annotation in the Annotations list in the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.

This deletes the annotation.


## 6.2 Measurements


This section covers the following topics:

- Creating, editing and deleting distance measurements
- Creating, editing and deleting area measurements, and
- Creating, editing and deleting double distance measurements.

### 6.2.1 Distance Measurements

You can measure the distance from one point to another. When you have measured a distance, you can modify the annotation and the end points of the measurement.

You can change the default text label, graphics color, and arrowhead style by selecting  and **Options > Results > Distance measurement**. The new graphics color and arrowhead style are applied to existing double distance measurements.


 When you navigate to another location in the volume, your measurement may not be displayed on the double-oblique viewport. This is because the points between which you measured do not lie on the currently visible slice. To see your measurement again, right-click on the measurement on the Results pane and select **Locate**; or double click on the measurement on the Results pane.

### 6.2.1.1 Creating Distance Measurements

You can add distance measurements to a viewport for analysis. Distance measurements are displayed in the Image View, and listed on the Results pane.



#### To measure a distance

1. Click  in the toolbar, or press the D key, or select **Results > Distance Measurement** in the menu.
2. Click and drag in the image from the start point of the measurement to the end point.
3. Select a predefined label, or type a custom label and press Enter.
4. Click and drag either arrowhead or the text to adjust the points of the image between which you want to measure.
5. Click outside the measurement. The graphic changes to white indicating it has left edit mode.

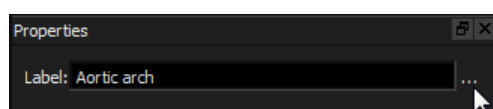
This adds the measurement to the Measurement list in the Results pane. At any time while the measurement is still active you can press Esc to remove the measurement.

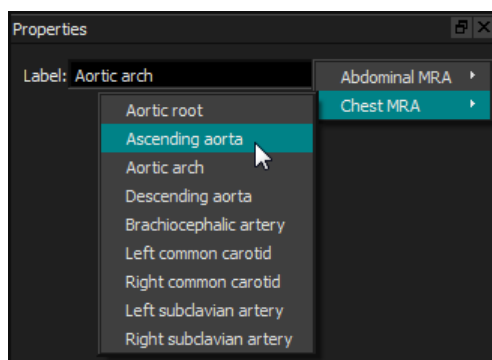
### 6.2.1.2 Editing Distance Measurements

You can modify the text and location of distance measurements that were added previously.

#### 6.2.1.3 To edit distance measurement text

1. On the Results pane, select the result.
2. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.





Or,

1. On the Results pane, right-click on the result and select **Edit**.
2. Select a predefined label, or type a custom label and press Enter.

#### To edit distance measurement end points

1. Click the distance measurement graphic.
2. Click and drag either arrowhead to adjust the points in the image between which you want to measure.

### 6.2.1.4 Copying Distance Measurements

You can copy a distance measurement to the clipboard.

To copy a distance measurement

- On the Results pane, right-click on the result and select **Copy to Clipboard**.

The result label and value are copied to the clipboard.

### 6.2.1.5 Deleting Distance Measurements

You can delete any distance measurement that was added to a viewport.

#### To delete a distance measurement

- Click the distance measurement graphic and press Delete.

Or,


1. Select the distance measurement in the Measurements list on the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.


This deletes the distance measurement.

## 6.2.2 Area Measurements

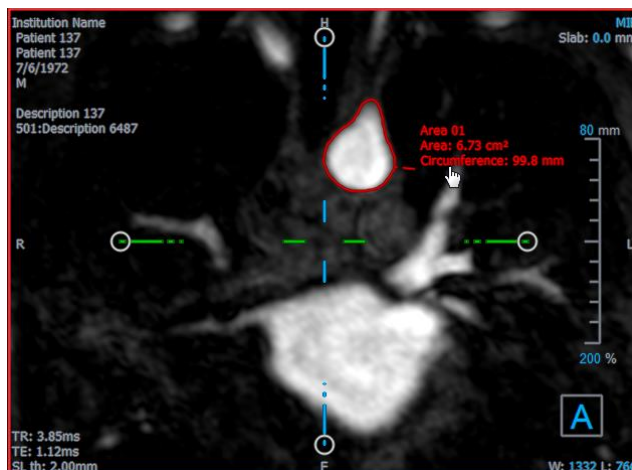
You use the area measurement tool to draw and measure 2D areas. When you have measured an area, you can modify the area contour or annotation.

You can change the default text label, graphics color, and which measurements are displayed by


selecting  and **Options > Results > Area measurement**. The new graphics color is applied to existing area measurements.

 When you navigate to another location in the volume, your measurement may not be displayed on the double-oblique viewport. This is because the 2D plane on which you measured the area is not coplanar with the currently visible slice. To see your measurement again, right-click on the measurement on the Results pane and select **Locate**; or double click on the measurement on the Results pane.

### 6.2.2.1 Creating Area Measurements



To measure an area

1. Click  in the toolbar, or press the A key, or select **Results > Area Measurement** in the menu.
2. Click and drag to draw the area. The contour is automatically closed when you release the mouse button.
3. Modify the contour as necessary (see Editing Area Measurements below).
4. In the Properties pane, check **Area** or **Circumference** to display either or both measurements.
5. Click outside the contour. The graphic changes to white indicating it has left edit mode.


This adds the measurement to the Measurement list in the Results pane. At any time while the measurement is still active you can press Esc to remove the measurement.

### 6.2.2.2 Editing Area Measurements

To modify the contour

1. Click the contour to make it active.
2. Near the existing contour click and drag an altered contour. The alteration will be combined with the original.

Or,

Right-click on the contour and drag it, using the rubber-band tool .

3. Click outside the contour. The graphic changes to white indicating it is no longer in edit mode.

### 6.2.2.3 Copying Area Measurements

You can copy an area measurement to the clipboard.

To copy an area measurement

- On the Results pane, right-click on the result and select **Copy to Clipboard**.

The result label and value(s) are copied to the clipboard.

### 6.2.2.4 Deleting Area Measurements

You can delete any area measurement that was added to a viewport.

To delete an area measurement

- Click the area measurement graphic and press Delete.

Or,


1. Select the area measurement in the Measurements list on the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.


This deletes the area measurement.

## 6.2.3 Double Distance Measurements

You use the double distance measurement tool to draw and measure two related distances. When you have measured a double distance, you can modify the annotation and the end points of the measurement.

You can change the default text label, graphics color for active and inactive status, and arrowhead

style by selecting  and **Options > Results > Double Distance measurement**. The new graphics color and arrowhead style are applied to existing distance measurements.


 When you navigate to another location in the volume, your measurement may not be displayed on the double-oblique viewport. This is because the points between which you measured do not lie on the currently visible slice. To see your measurement again, right-click on the measurement on the Results pane and select **Locate**.

### 6.2.3.1 Creating Double Distance Measurements

You can add double distance measurements to a viewport for analysis. Double Distance measurements are displayed in the Image View, and listed on the Results pane.



To measure a double distance

6. Click  icon in the toolbar, or press the R key, or select **Results > Distance Measurement** in the menu.
7. In the same way than for the Distance measurement, click and drag in the image twice to create the two measurements.
8. Select a predefined label, or type a custom label and press Enter.
9. Click and drag any of the following elements to suit your needs:
  - Arrow heads
  - Measurement lines' bodies
  - Text
10. Click outside the measurement. The graphic changes to inactive indicating it has left edit mode.

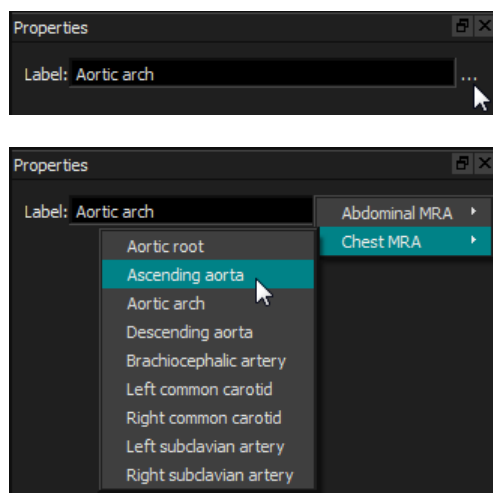
This adds the measurement to the Measurement list in the Results pane. At any time while the measurement is still active you can press Esc to remove the measurement.

### 6.2.3.2 Editing Double Distance Measurements

You can modify the text and location of the double distance measurements that were added previously.

#### To edit double distance measurement text

1. On the Results pane, select the result.
2. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.



Or,

3. On the Results pane, right-click on the result and select **Edit**.
4. Select a predefined label, or type a custom label and press Enter.

#### To edit double distance measurement end points

1. Click the double distance measurement graphic.
2. Click and drag any arrow head to adjust the points in the image between which you want to measure.

### 6.2.3.3 Copying Double Distance Measurements

You can copy a double distance measurement to the clipboard.

To copy a double distance measurement

- On the Results pane, right-click on the result and select **Copy to Clipboard**.

The result label and values are copied to the clipboard.

### 6.2.3.4 Deleting Double Distance Measurements

You can delete any double distance measurement that was added to a viewport.

To delete a double distance measurement

- Click the double distance measurement graphic and press Delete.

Or,

3. Select the double distance measurement in the Measurements list on the Results pane.
4. Press Delete on your keyboard or right-click and select **Remove**.


This deletes the double distance measurement.


## 6.3 Snapshots

You can save snapshots as evidence of a diagnosis. Snapshots are displayed on the Properties pane, and are listed on the Results pane. When a snapshot is created, you can modify the name at any time. A snapshot can be exported as described in section 6.5.2.5.

You can change the default text label by selecting  and **Options > Results > Snapshot**.

A snapshot contains by default all graphics elements but no text. You can also include all text for


future snapshots by checking the option  and **Options > Results > Snapshot > Include overlay text**.

 When you navigate to another location in the volume, the annotations and measurements shown in the snapshot may not be displayed on the double-oblique viewport. This is because the points at which the annotations and measurements were created do not lie on the currently visible slice. To return to the same slice where a snapshot was created, right-click on the snapshot on the Results pane and select **Locate**; or double click on the snapshot on the Results pane.

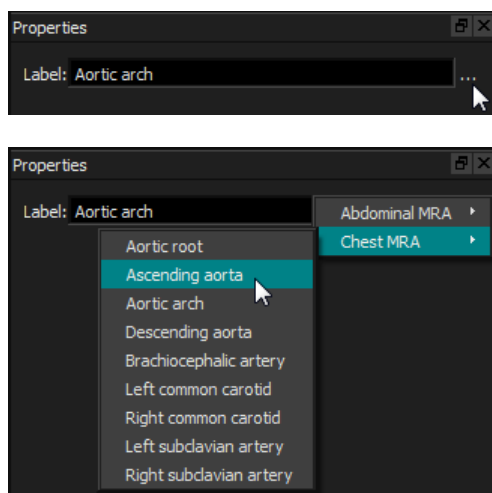
### 6.3.1 Creating Snapshots

You can create a snapshot of the current state of any viewport.

To save a snapshot

1. Click  in the toolbar, or press the S key, or select **Results > Snapshot** in the menu.
2. Click the viewport that you want to save as a snapshot.
3. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.





### 6.3.2 Deleting Snapshots

You can delete any snapshot that was created.

#### To delete a snapshot

1. Select the snapshot in the Snapshots list on the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.

This deletes the snapshot.

## 6.4 Sculpting

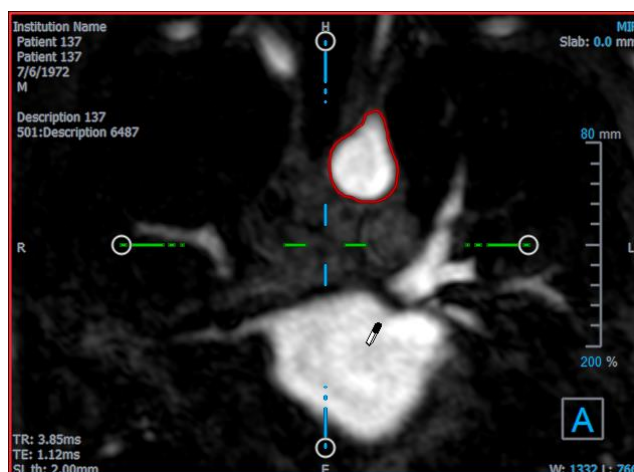
You can remove extraneous information from the volume using sculpting. This can help draw attention to the subject of interest. Once created, you can later modify a sculpture. Sculptures are usually saved as part of a reformat.

You can change the default text label by selecting  and **Options > Results > Sculpture**.

### 6.4.1 Creating Sculptures

Sculpting is done by drawing a 2D contour which is then projected through the volume. Thus, it can be useful to first orient the volume strategically before drawing the contour. You can then remove (or restore) the voxels inside or outside the contour.


Original  
(with sculpture  
contour)




Sculpted




### To create a sculpture

1. Click  in the toolbar, or select **Results > Sculpture** in the menu.
2. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.
3. Click and drag to draw the contour. The contour is automatically closed when you release the mouse button.

 Anytime a contour is active, you can delete it by pressing the Delete key.

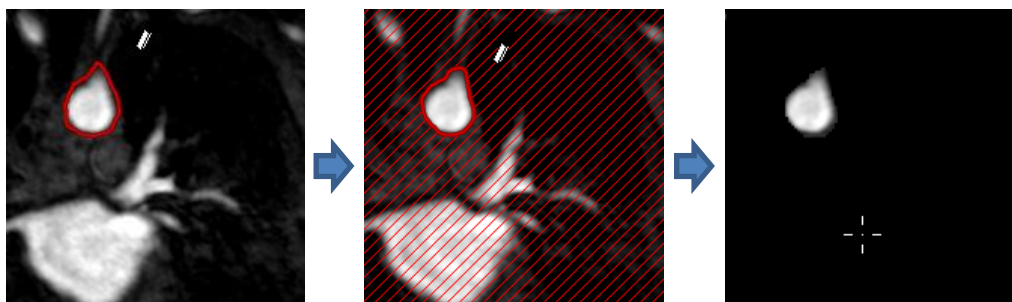
4. Modify the contour as necessary.
  - Near the existing contour click and drag an altered contour. The alteration will be combined with the original.



Or,

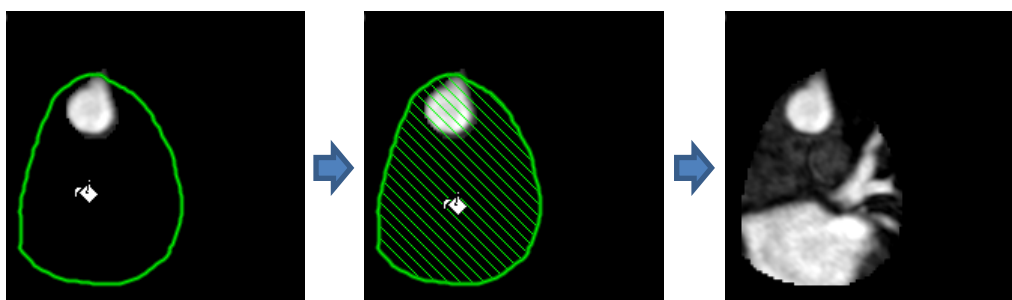
- Right-click on the contour and drag it, using the rubber-band tool .

5. On the Properties pane, select the desired **Action**.


With  **Exclude** selected the mouse cursor changes to an eraser  in the viewport.



With  **Include** selected the mouse cursor changes to a paint bucket  in the viewport.



6. Click inside or outside the contour to perform the selected action.



 Pressing the SHIFT key before the click performs the selected action on the opposite region, inside instead of outside or outside instead of inside.

7. Navigate in the volume as desired.

- Stacking: Wheel.
- Zooming: CTRL+wheel.
- Panning: CTRL+click and drag, or middle-click and drag.
- Rotate: ALT+click and drag.
- Window width and level: Right-click and drag.

8. Repeat steps 3 - 7 as necessary.

9. Click **Finish** on the Properties pane.




 While editing a sculpture, you can hide the axes if they get in the way by toggling the **Axes** toolbar button .

 You can restore the complete volume temporarily.

- If you are editing the sculpture, clear the **Apply sculpture** checkbox on the Properties pane.

- If you are not editing the sculpture, right-click on the sculpture on the Results pane and clear the checkbox next to **Apply**.



You can undo or redo an action by clicking the  or the  button. You can undo all actions by clicking the  button.

## 6.4.2 Editing Sculptures

You can edit the sculpture label in any state, but to edit the sculpture itself you must enter its edit mode.

### To edit sculpture text

1. On the Results pane, select the sculpture.
2. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.

Or,

1. On the Results pane, right-click on the result and select **Edit**.
2. Select a predefined label, or type a custom label and press Enter.

### To edit a sculpture

1. On the Results pane, right-click on the result and select **Edit**.
2. Follow the instructions in section 6.4.1 beginning at step 3.

## 6.4.3 Deleting Sculptures

You can delete any sculpture.

### To delete a sculpture

1. Select the sculpture in the **Sculptures** list on the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.

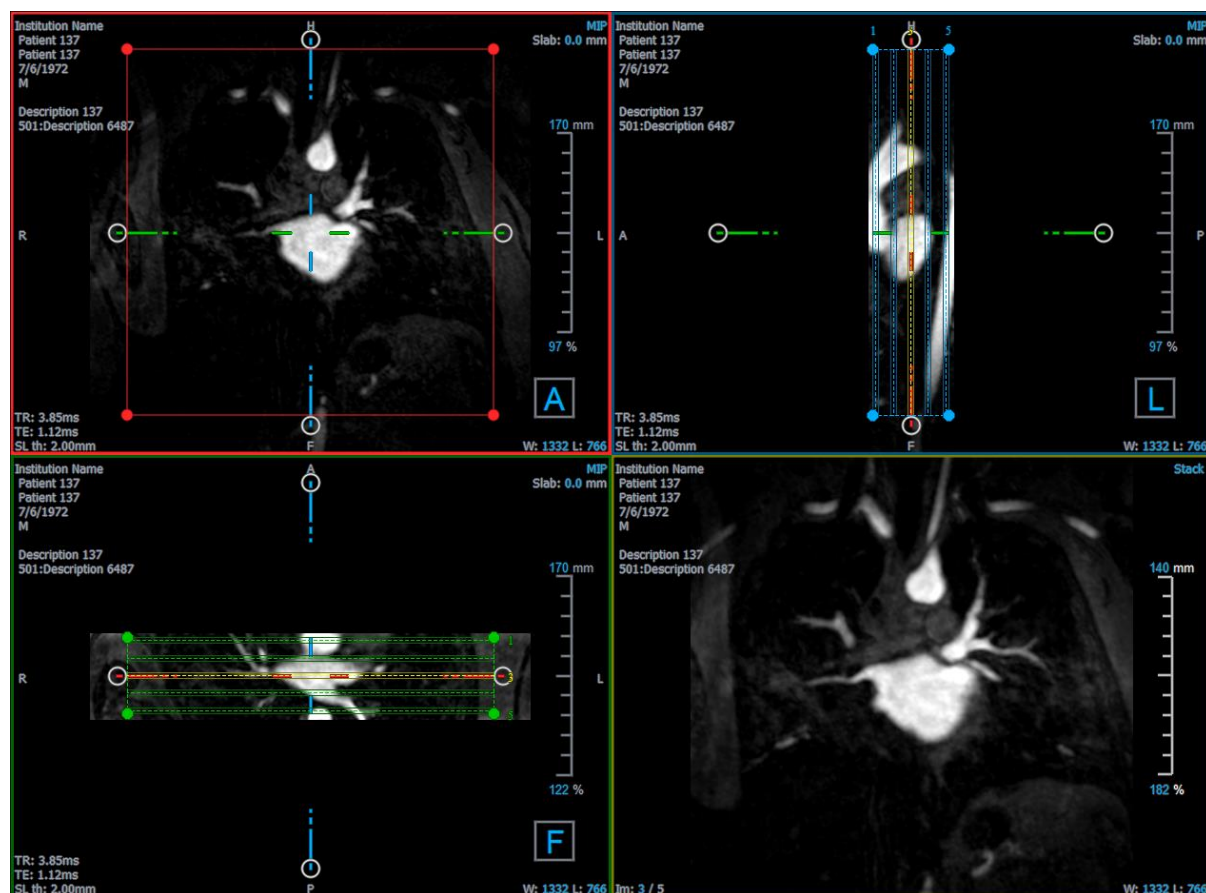
This deletes the sculpture.

## 6.5 Reformatting

You can create a new volume based on a sampling of the existing volume at any affine transformation, such as scaling, rotation, or translation, achieved through the 3D View user interface. You can also create a new volume based on a radial sampling of the existing volume.

## 6.5.1 Stack Reformatting

A stack reformat is a sampling of the existing volume at the translation, rotation and zoom currently displayed in the double-oblique view. The sampling is stored as a series of slices. The sample spacing is defined as a property of the reformat.





You can change the default properties by selecting  and **Options > Results > Reformat**.

Stack reformats can be saved in DICOM format and reopened in 3D View. Stack reformats can also be saved as a video in AVI format. Videos must be opened with a compatible viewer.

### 6.5.1.1 Creating Stack Reformats

You may want to orient the volume before performing a stack reformat. Stack reformats are listed on the Results pane.

**To create a stack reformat**

1. Click  in the toolbar, or  and **Calipers > Reformat** in the menu.
2. Click in the viewport that is coplanar to the first slice.


Overlay graphics appear that indicate the initial geometry of the stack.

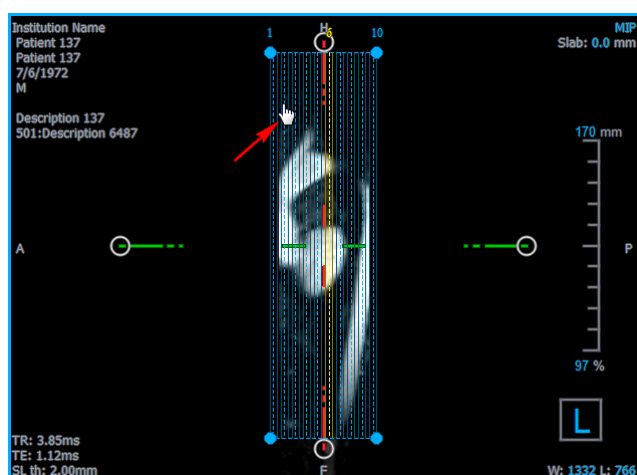
The lower-right viewport switches to the Stack view and shows the reformatted slices.

3. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.
4. Adjust other properties as necessary (see sections 6.5.1.2 and 6.5.1.3). You can also position the overlay graphics with the mouse, or modify the size using the circular grip handles. The currently displayed slice in the Stack view is updated for each change.
5. Click **Finish** on the Properties pane. The remaining slices for the Stack view are calculated.

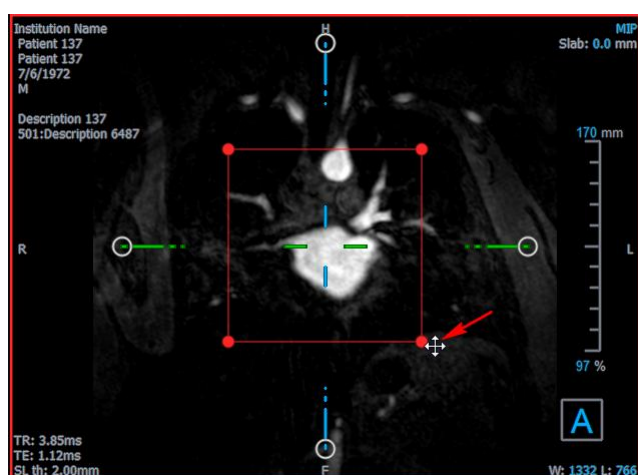
### 6.5.1.2 Stack Reformat Interactive Graphics

When a stack reformat is active, you can manipulate the interactive graphics in several ways.

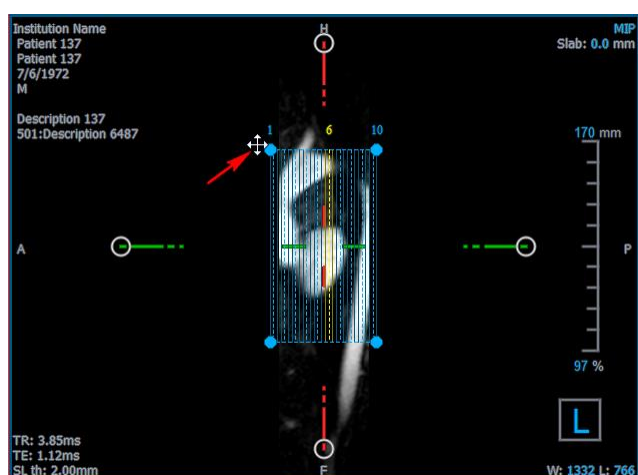
When the Pointing mouse cursor  is visible, you can translate the volume on any double-oblique viewport.



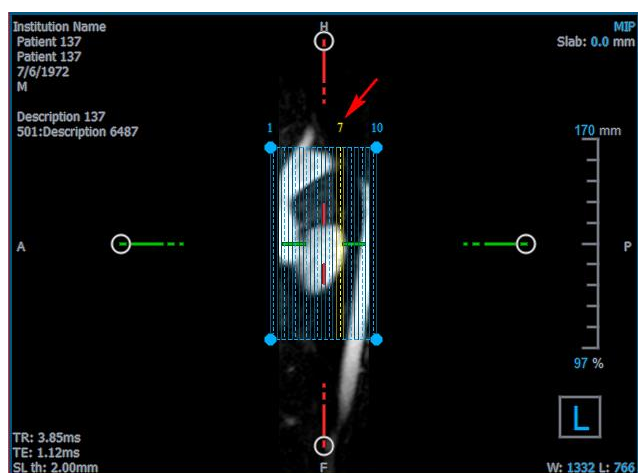
You can adjust the size of each slice on the top view with the circular grip handles.



You can adjust the number of slices on the side view with the circular grip handles.



Using the scroll wheel in the Stack view in the lower-right viewport, you can scroll through the current set of slices. The position of the slice is indicated by the yellow lines and indices in the two side-view double-oblique views.



### 6.5.1.3 Stack Reformat Properties

You can edit the properties of a stack reformat while creating it, or afterward by right-clicking on the stack reformat on the Results pane and selecting **Edit**.



- |                                     |   |
|-------------------------------------|---|
| <b>Label:</b>                       | The text label for this reformat. Click the ellipsis to choose from a list of predefined labels, or type a custom label.  |
| <b>Method:</b>                      | The method (Stack) used to generate this reformat. This cannot be changed.  |
| <b>Projection method:</b>           | The projection method (Maximum Intensity (default), Minimum Intensity, or Average Intensity) for this reformat.   |
| <b>Rows x Columns:</b>              | The number of voxel rows and columns for each slice of the reformat. If <b>Enable square field of view</b> is checked, the format is restricted to square slices.                                     |
| <b>Field of View (mm):</b>          | Physical size of each slice.  |
| <b>Slice count:</b>                 | Number of slices.   |
| <b>Slice thickness (mm):</b>        | Physical thickness of each slice. The projection method is performed over this thickness.   |
| <b>Slice gap (mm):</b>              | Physical distance between slices. A negative value results in overlap between the slices.   |
| <b>Resize mode:</b>                 | The property that changes when you move the circular grip handles of the stack.   |
| <b>Enable square field of view:</b> | When checked (default) the field of view is forced to be square. To improve compatibility with other applications, images saved with a non-square field of view are padded to produce a square image. |



**Show graphics:** When checked shows the graphics overlay in the Image View.

**Apply to all time points:** When checked the reformat is applied for all time points.

#### 6.5.1.4 Editing Stack Reformats

You can modify the properties of a stack reformat after creating it.

##### To edit a stack reformat

1. Right-click on the stack reformat on the Results pane and select **Edit**.
2. Modify the properties on the Properties pane as needed.  
  
Or,  
  
Click and drag the interactive graphics on the double-oblique view.
3. Click **Finish** on the Properties pane. The remaining slices for the Stack view are calculated.

#### 6.5.1.5 Deleting Stack Reformats

You can delete any stack reformat that was created.

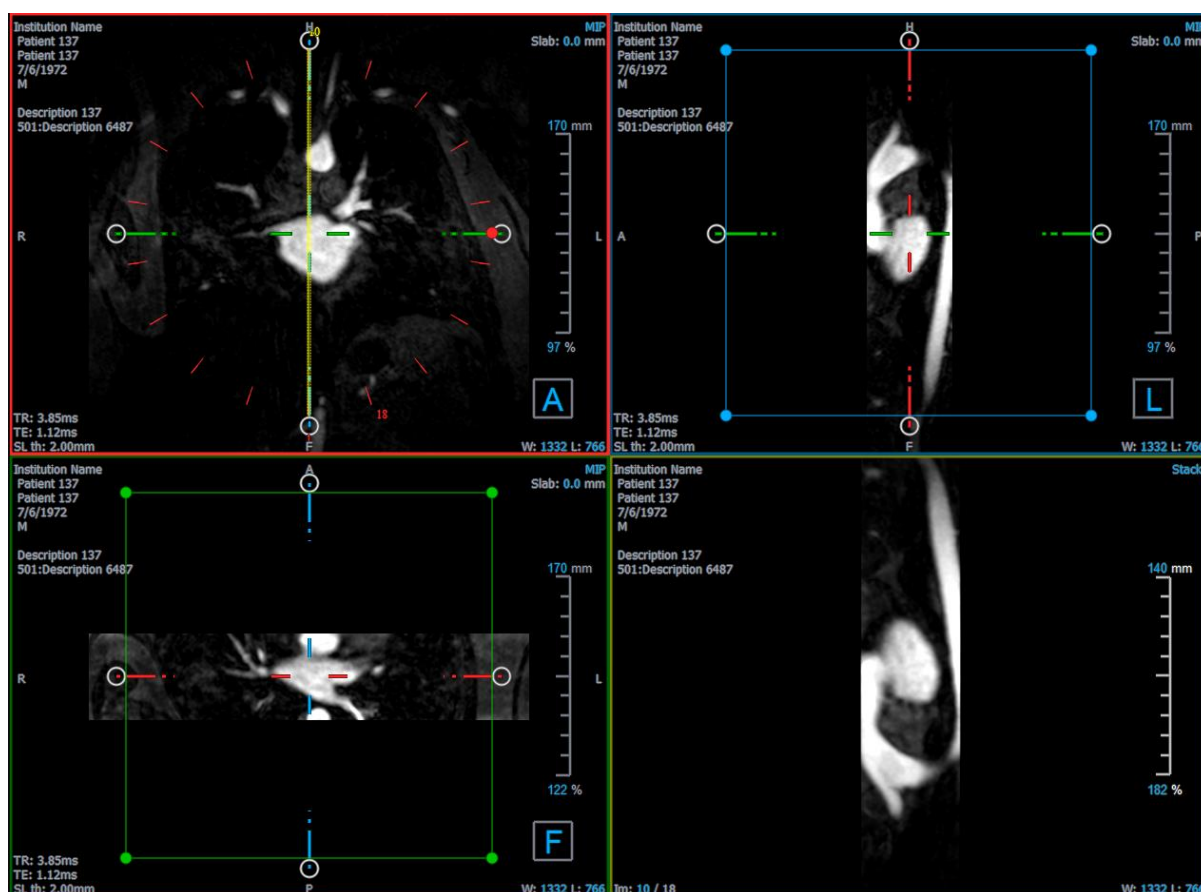
##### To delete a stack reformat


1. Select the stack reformat in the Reformats list on the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.

This deletes the stack reformat.

#### 6.5.2 Radial Reformatting

A radial reformat is a radial sampling of the existing volume at the translation, rotation and zoom currently displayed in the double-oblique view. The sampling is stored as a series of radially spaced slices. The sample spacing is defined as a property of the reformat.





You can change the default properties by selecting  and **Options > Results > Radial reformat**.

Radial reformats can be exported in DICOM format or as a video in AVI format, but neither can be reopened in 3D View. Videos must be opened with a compatible viewer.

### 6.5.2.1 Creating Radial Reformats

You may want to orient the volume before performing a radial reformat. Radial reformats are listed on the Results pane.

**To create a radial reformat**

1. Click  in the toolbar, or select  and **Calipers > Reformat-Radial** in the menu.
2. Click in the viewport where you want to view the radial spoke pattern.

Overlay graphics appear that indicate the initial geometry of the reformat.


The lower-right viewport switches to the Stack view and shows the reformatted slices.

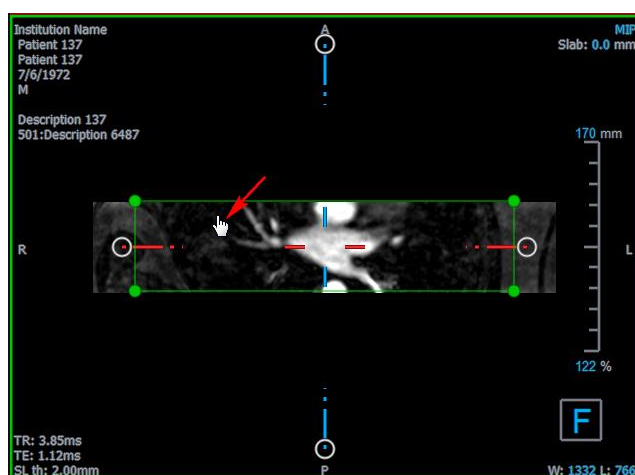
3. On the Properties pane, click the ellipsis on the right of the **Label** field and select a predefined label, or type a custom label and press Enter.

4. Adjust other properties as necessary (see sections 6.5.2.2 and 6.5.2.3). You can also position the overlay graphics with the mouse, or modify the size using the circular grip handles. The currently displayed slice in the Stack view is updated for each change.
5. Click **Finish** on the Properties pane. The remaining slices for the Stack view are calculated.

## 6.5.2.2 Radial Reformat Interactive Graphics

When a radial reformat is active, you can manipulate the interactive graphics in several ways.

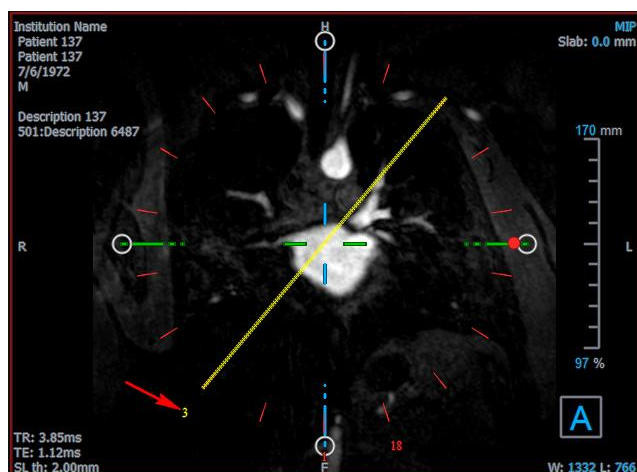
When the Pointing mouse cursor  is visible, you can translate the volume on any double-oblique viewport.



You can adjust the size of a slice with the circular grip handles.

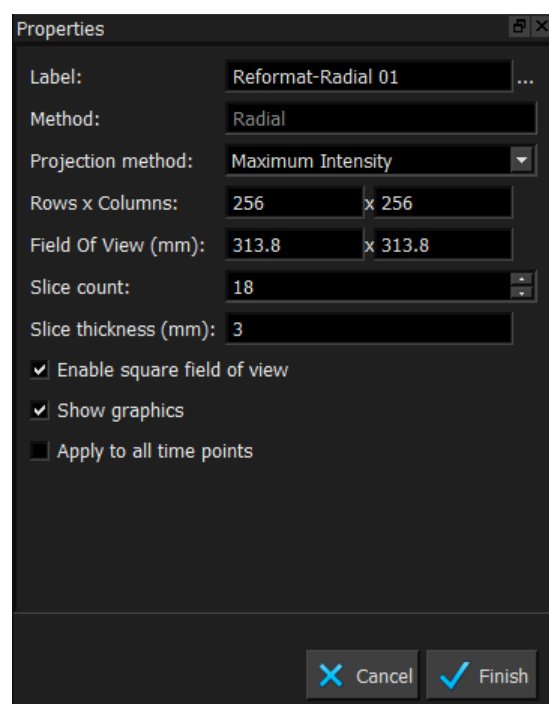


Using the scroll wheel in the radial double-oblique view or the Stack view in the lower-right viewport, you can scroll through the current set of slices. The position of the slice is indicated by the yellow line and index in the radial double-oblique view.



### 6.5.2.3 Radial Reformat Properties

You can edit the properties of a radial reformat while creating it, or afterward by right-clicking on the radial reformat on the Results pane and selecting **Edit**.



- |                           |  |
|---------------------------|--|
| <b>Label:</b>             | The text label for this reformat. Click the ellipsis to choose from a list of predefined labels, or type a custom label. |
| <b>Method:</b>            | The method (Radial) used to generate this reformat. This cannot be changed.  |
| <b>Projection method:</b> | The projection method (Maximum Intensity (default), Minimum Intensity, or Average Intensity) for this reformat.          |

<b>Rows x Columns:</b>	The number of voxel rows and columns for each slice of the reformat. If <b>Enable square field of view</b> is checked, the format is restricted to square slices.
<b>Field of View (mm):</b>	Physical size of each slice.
<b>Slice count:</b>	Number of slices. The slices are always equally spaced over 360°.
<b>Slice thickness (mm):</b>	Physical thickness of each slice. The projection method is performed over this thickness.
<b>Enable square field of view:</b>	When checked (default) the field of view is forced to be square. To improve compatibility with other applications, images saved with a non-square field of view are padded to produce a square image.
<b>Show graphics:</b>	When checked shows the graphics overlay in the Image View.
<b>Apply to all time points:</b>	When checked the radial reformat is applied for all time points.

#### 6.5.2.4 Editing Radial Reformats

You can modify the properties of a radial reformat after creating it.

##### To edit a radial reformat

1. Right-click on the radial reformat on the Results pane and select **Edit**.
  2. Modify the properties on the Properties pane as needed.
- Or,
- Click and drag the interactive graphics on the double-oblique view.
3. Click **Finish** on the Properties pane. The remaining slices for the Stack view are calculated.

#### 6.5.2.5 Deleting Radial Reformats

You can delete any radial reformat that was created.


##### To delete a radial reformat

1. Select the radial reformat in the Reformats list on the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.

This deletes the radial reformat.

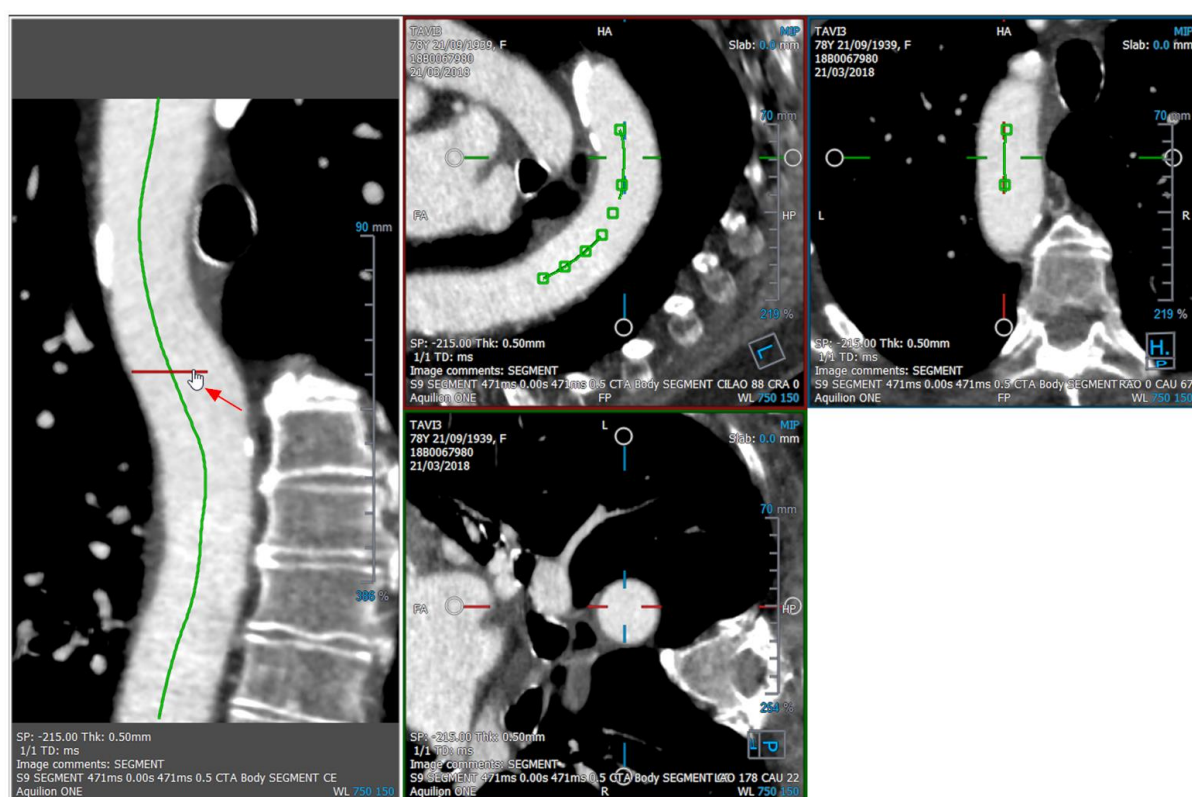
## 6.6 Curved Planar Reformats

You can create a curved planar reformat (CPR) using a set of interaction points clicked on the oblique viewports. This helps in visualizing vascular structures along their path. Multiple reformats can be created to represent and visualize several vessels.

The default text label for each procedure can be changed by selecting  and **Options > Hangings > CPR**.

### 6.6.1 Creating CPRs

CPRs are derived using a set of 3D interaction points clicked by the user. Since such reformats are usually created for a vessel, choose a vessel-of-interest whose anatomy needs to be studied.



To create a path line along the vessel

1. Click (symbol) in the toolbar, or select **Procedures > CPR** in the menu.



2. You can use one of the two techniques below to enter the creation-mode (cross-hair mouse cursor):

- On the Properties pane, click on **Set A Point**. The button will change its appearance indicating creation-mode.

Or,

- Hold down “C” key. Observe the change in the appearance of **Set A Point**.

You can start tracing a vessel by clicking on any oblique viewport. Once a minimum of 4 interaction points are clicked, a green path line connecting the points is visible on the viewports.

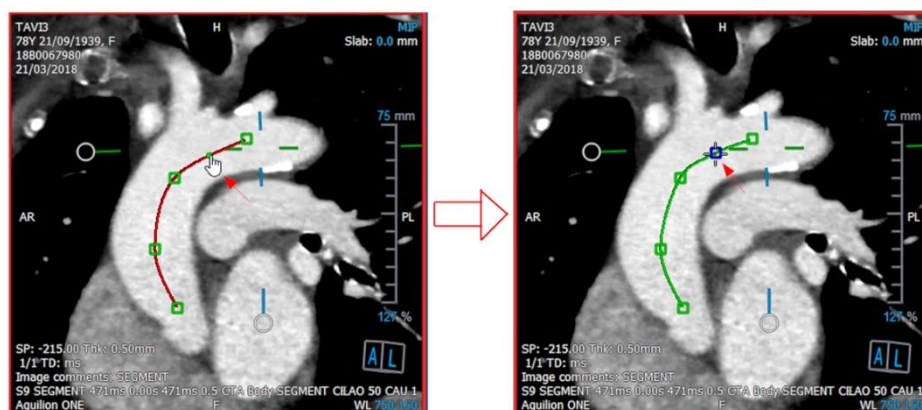
ⓘ A path line is visible if a minimum of 4 interaction points are clicked. Depending on the plane of the drawn image, the complete (or a part of the) path line is shown.

#### To edit or delete an existing interaction point

1. You can drag an existing interaction point to a different location. The path line is automatically updated while this is done.
2. You can remove an existing interaction point with a right-click on the point.

#### To add an intermediate interaction point along the path

1. Hover over the path line using the mouse cursor. Once you have reached the preferred location, left-click on the marker ball (green) that indicates the position of the new point.




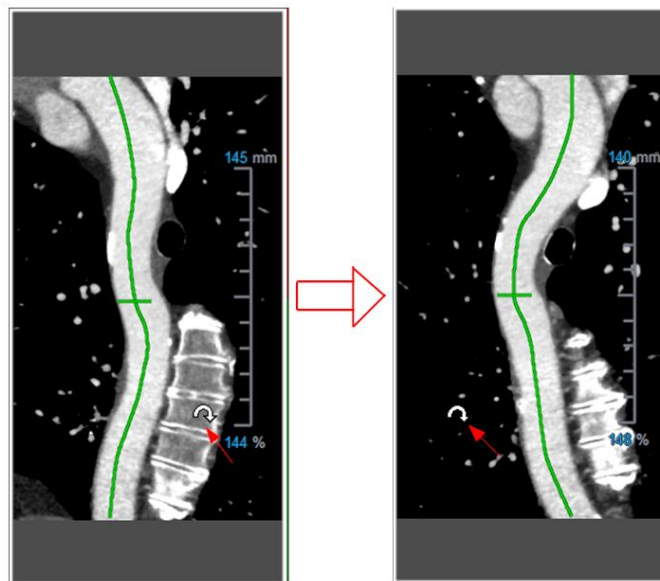
💡 By default, a new interaction point is always appended to the end of the list. To add intermediate interaction points, the path line *should* be visible on the viewport.


### 6.6.1.1 CPR Viewport

You can visualize the stretched CPR image on the vertical viewport. The image is shown once the path line is visible on the oblique viewports. This viewport provides all basic functionalities, such as panning, zooming and the window width/window level modifications.

#### To rotate the vessel

1. Choose the  tool from the Toolbar.
2. While holding the left-mouse button down, move the cursor horizontally along the viewport.

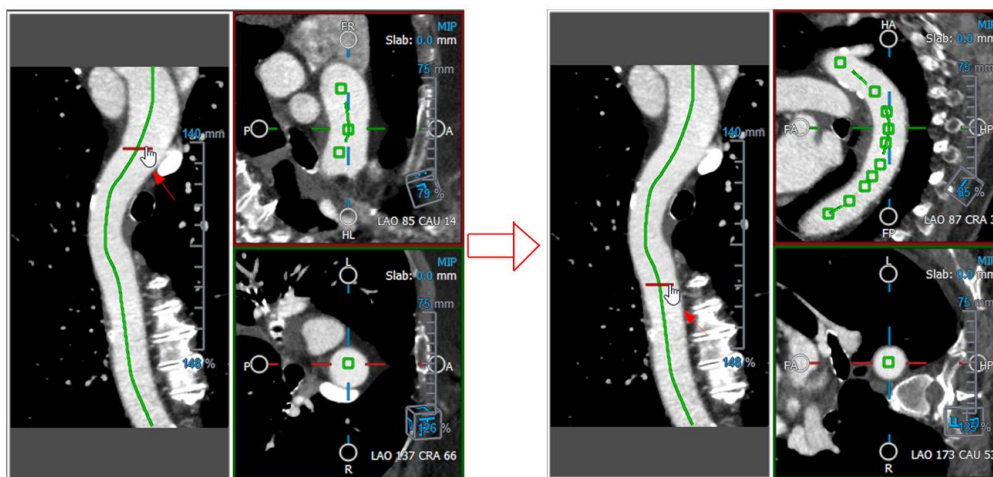


 This viewport **does not** support any measurements.

### 6.6.1.2 Navigating along the Path Line Overlay

You can axially visualize the contours of the vessel at any location along it by using a position marker tool attached to the path line overlay (green). At a given location along the path line, the 3D position and orientation of the path line can be derived and used to visualize the vessel on the oblique viewports.





To obtain the axial view of the vessel on the oblique viewports

1. In the Properties pane, enable/disable the following options based on their respective outcomes:
  - a. If ☒ **Synchronize Position** is checked, the position of the cross-hair on the oblique viewports will be reset to the current position of the marker tool on the CPR viewport.
  - b. If ☒ **Synchronize Orientation** is checked, the orientation of the image follows the orientation of the path line.
  - c. If ☒ **Auto-Center Oblique View** is checked, the oblique views are auto-centered.
2. Drag the position marker tool along the path line overlay to a location-of-interest.



Both the orientation and auto-center options are unavailable if the position synchronize is disabled.

## 6.6.2 Editing CPRs

You can edit the CPR label in any state, but to edit the created CPR itself you must enter its edit mode.

To edit CPR text

1. On the Results pane, select the CPR.
2. In the Properties pane, type a custom label and press Enter.

Or,

1. On the Results pane, right-click on the results and select **Edit**.
2. Type a custom label and press Enter.

To edit a CPR

1. On the Results pane, right-click on the result and select **Edit**.

Type a custom label and press Enter.

## 6.6.3 Deleting CPRs

### To delete a CPR

1. Select a CPR in the **CPR Procedures** list on the Results pane.
2. Press Delete on your keyboard or right-click and select **Remove**.

This deletes the curved planar reformat.

## 6.7 Export Results

You can export snapshots and reformats. This chapter covers exporting those results to the file system.

### 6.7.1 Exporting Results to File System

You can save snapshots and reformats to a location on your system or network. For snapshots, the file formats that you can choose from are BMP, DICOM, JPEG, and PNG. For reformats, the file formats that you can choose from are DICOM and AVI.


#### To save a snapshot to the file system

1. On the Results pane, right-click on a snapshot and select **Export to....**

This opens the Export file dialog.

2. Select the location where you want to save the snapshot.
3. Type a name for the file in the **File name** field.
4. Select the file type (BMP, DICOM, JPEG, or PNG) from the **Save as type** drop-down list.
5. Click **Save**.



You can change the default location to which the files are saved by selecting  and choose **Options > General > Export path**.

#### To export a reformat to the file system

1. On the Results pane, right-click on a reformat and select **Export to....**

This opens the Export file dialog.

2. Select the location where you want to export the reformat.
3. Type a base name for the files in the **File name** field.


For DICOM file type, this is a base name to which is appended a number per DICOM file.

4. Select the file type from the **Save as type** drop-down list.

- DICOM: The volume is saved as DICOM.
- AVI - stack: Exports all the reformatted slices in the active time point.
- AVI - time resolved: Exports the center slice from all time points.

5. Click **Save**.



You can change the default location to which the files are saved by selecting  and choose **Options > General > Export path**. You can also select whether to create a subfolder automatically.

**To send a reformat to the Medis Suite patient browser**

1. On the Results pane, right-click on a reformat and select **Send to Medis Suite....**

The reformat is stored in DICOM and visible within the patient browser located in Medis Suite.

## 6.7.2 Finishing and saving the session

When you have finished with 3D View, press the save session button on the Medis Suite if you choose to Save any results.



For a detailed description on stopping a Medis Suite session, refer to the Medis Suite Quick Start/User Manual.

## 7 Troubleshooting

### Floating license error after a crash of the software

In a floating license setup, licenses will be returned to the license server when 3D View is closed. In case of an 3D View software crash, the licenses will not be returned and remain locked on the license server. Restarting 3D View will give a warning that the licenses are not available.

To solve this issue, you have to wait at most 2 minutes before you can start the software again. The license server checks every 2 minutes if the claimed licenses are still in use on the client machine. If the licenses are not in use, the license server will release the licenses.

### Expiration date not updated after installing non-expiring license

When you install a temporal license with CMS License Manager the license will be given an expiration date. You can see this expiration date in **View available licenses...** in CMS License Manager. When you install a non-expiring license after you installed the temporal license the expiration date is not updated.

To see the correct expiration date of your licenses, you have to delete the expiring license before you install the non-expiring license. You can do this with the following steps:

- Start CMS License Manager (click **Start > All Programs > Medis System Tools > CMS License Manager 2.5**)
- Click **Advanced...**
- Click **Delete licenses...**
- Select all the expiring licenses
- Click **Delete**
- Click **Close**
- Click **Close**
- Click **Install an additional license...**
- Browse to the license file with the non-expiring license
- Make sure all licenses are selected
- Click **Install**
- Click **Close**

You are now able to see the licenses with their correct expiration date in **View available licenses...**

### MIP and 3DVR images are black

Some graphics adapters exhibit incompatibility with 3D View by not displaying the MIP, 3DVR and LUT thumbnail images. (If only the 3DVR and LUT thumbnails are black, see below.) In many cases, this is also accompanied by errors related to VTK in CMS Monitor. This may be resolved by having the system administrator update the graphics adapter driver. Otherwise, operation of 3D View using only the double oblique views (DOV) is still


possible by disabling the option in  > **Options > Hangings > DoubleOblique > Enable hardware rendering**.

### 3DVR image is black

Some graphics adapters exhibit incompatibility with 3D View by not displaying the 3DVR and LUT thumbnail images, although the MIP is displayed. In many cases this can be resolved by

disabling the option in  > Options > Hangings > DoubleOblique > Enable hardware shading.

### “Hardware rendering disabled” is displayed on the MIP/3DVR view

If the option in  > Options > Hangings > DoubleOblique > Enable hardware rendering is unchecked, the MIP, 3DVR and LUT thumbnails will not be generated.

### Custom LUT is not saved as expected

It may appear that your custom LUT is not saved as expected, particularly if you move the first or last point in the LUT; however, note that this is intended behavior. The LUT is displayed in the LUT Editor based on the **Window** and **Level** settings defined in the data set.

### Menu commands or toolbar buttons are disabled

Menu commands or toolbar buttons may be grayed out when you are performing a procedure, such as a radial reformat. You can make them active again by canceling or finishing the procedure.

### Window width and level are not applied

Different window width and level values are maintained for the double-oblique view, MIP view and 3DVR view.

### Annotation or measurement is not visible

When you navigate to another location in the volume, your annotation or measurement may not be displayed on the double-oblique viewport. This is because the point to which the result refers does not lie on the currently visible slice. To see your result again, right-click on the result on the Results pane and select **Locate**; or double click on the result on the Results pane.

### The mouse cursor inside a sculpture contour will not change to the eraser or fill icon

A small contour area may not provide enough distance from the edge of the contour area to enable the eraser or fill cursor icon. In this case, move the cursor outside the contour until the desired mouse cursor appears, press the SHIFT key, and then click the mouse button. Pressing the SHIFT key before the click performs the selected action on the opposite region, inside instead of outside or outside instead of inside.

### Your issue was not resolved in this troubleshooting section

You may find it useful to run the CMS Monitor diagnostic tool (click **Start > All Programs > Medis System Tools > CMS Monitor 3.5**) and view the messages displayed. If the logged messages do not resolve your problem, click on the **Send** button in CMS Monitor to send relevant information to the Medis help desk. Additional contact information can be found by clicking **Help > About...**

## 8 Shortcut Keys

When you are working with 3D View, you can use several combinations of keys on your keyboard and mouse actions to quickly perform the following tasks.

Press	To
<b>General</b>	
F1	Access the user manual
CTRL+G	Open the Medis website
CTRL+X	Close 3D View
Alt+F4	Close 3D View
<b>Layout</b>	
F6	Reset toolbar and workspace window pane layout
F10	Expand the currently selected viewport.
SPACE	Toggle among MIP, 3DVR and Stack view, with the lower-right viewport selected.
BACKSPACE	Toggle in reverse order among MIP, 3DVR and Stack view, with the lower-right viewport selected.
F11	Show or hide the workspace window panes
<b>Results</b>	
D	Create a distance measurement
A	Create an area measurement

Press	To
R	Create a double distance measurement
S	Create a snapshot
Esc	Stop editing the result
Delete	Delete the currently selected result
SHIFT+Delete	Delete all results
<b>Navigation Controls</b>	
Wheel	Stacking
SHIFT+ALT+click and drag	Stacking
CTRL+Wheel	Zooming
SHIFT+CTRL+click and drag	Zooming
CTRL+click and drag	Panning
Middle-click and drag	Panning and hides graphics
ALT+click and drag	Swivel (double oblique) or rotate (MIP, 3DVR)
Right-click and drag	Window width and level
<b>Viewing Controls</b>	
1	Reset the window width and level
CTRL+K	Show or hide the axes
ALT+right-click	Hide the overlay graphics

Press	To
Arrow left	Display the previous time point
Arrow right	Display the next time point