



# **LocalEye Viewer, version 10**

*User Manual*



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## 1 Abbreviations

Abbreviation	Description
DICOM	Digital Imaging and COmmunications in Medicine
DLL	Dynamic Link Library
DPI	Dots Per Inch
GUI	Graphical User Interface
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
JAI	Java Advanced Imaging
JRE	Java Runtime Environment
JWS	Java Web Start
LAN	Local Area Network
LUT	Look-Up Table
PACS	Picture Archiving and Communication System
PC	Personal Computer
RAM	Random Access Memory
SR	Structured Report
TCP	Transfer Control Protocol
URL	Uniform Resource Locator

## 2 Indications for use

The LocalEye Viewer software product is intended to be used as a medical image viewer to visualize and review medical multi-modality image data stored on a portable medium (CD, DVD, USB stick, etc.) in DICOM format, as well as eventual related reports.

LocalEye Viewer is NOT intended for diagnostic reading and reporting of medical exams.

Typical users of LocalEye Viewer are trained healthcare professionals, including but not limited to radiologists, physicians, nurses and technicians.

## 3 Introduction

The following chapters explain the user features available from the LocalEye Viewer's Graphical User Interface (GUI) and how to exploit the capabilities of this system.

The LocalEye Viewer's GUI is composed of the following main panels and toolbars:

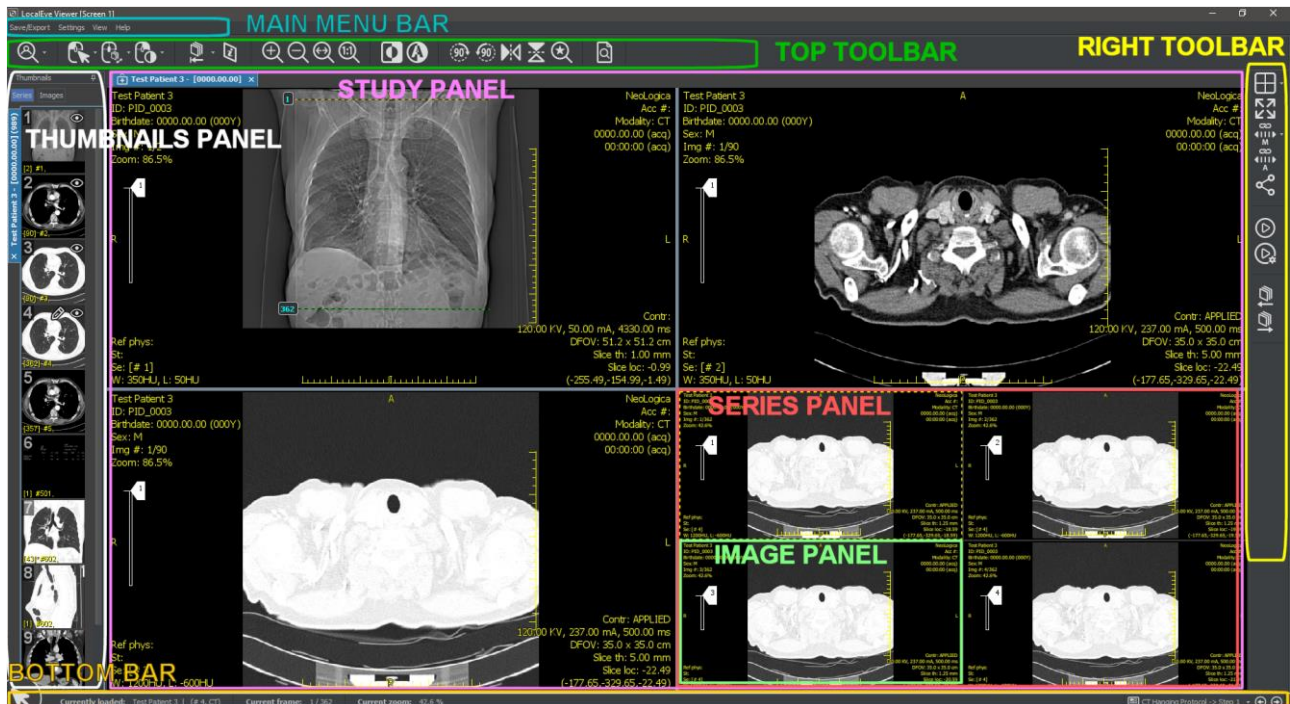
- *Main menu bar*: this top menu bar allows accessing the main functionalities of the viewer.
- *Top, and left and right toolbars*: these toolbars contain buttons which correspond with actions available within the viewer. Example of such actions are: patients/studies search, association of tools

with mouse buttons, image manipulation functions, display layout configuration functions, reporting functions, etc.

In LocalEye Viewer's default configuration, there are no buttons configured for the left toolbar, so the GUI will appear with just a top toolbar and a right toolbar.

- *Study panel(s)*: each study loaded in LocalEye Viewer is displayed in its own dedicated *study panel*. By default, multiple study panels are arranged in a "tabbed" fashion. However, it is possible to manually drag the tab title of each study panel to arrange and dock the panel according to the user's preference (e.g., in a side-by-side fashion). A study panel contains one or more series panels, depending on the "series tiling" (or series layout) currently set on that study panel.
- *Series panel(s)*: each study panel contains one or more *series panels*, depending on the series tiling currently set on the study panel. Each series panel contains and shows images belonging to a given series or sequence. In turn, each series panel contains one or more *image panels*, depending on the "image tiling" (or image layout) currently set on that series panel.
- *Thumbnails panel*: this panel displays thumbnail images. The thumbnails may represent the available series or all available images, depending on the user's choice. This thumbnails panel can be dragged (through the panel's title bar) to a different position within the viewer's window, and can be arranged either vertically or horizontally, according to user's preference.
- *Bottom bar*: this thin bar located at the bottom of the viewer's window contains several context-specific tools and information. In the left edge, it shows the currently-active mouse tool. Next to the currently-active tool, it shows the *tool options panel* related to this currently-active tool, showing the options and information related to this tool. Hence, the content of this tool options panel changes according to the currently-active mouse tool. Then, in the right portion of the bottom bar we can find the *hanging steps / hanging views selection and iteration panel*. Finally, in the right edge of the bottom bar we can find the *viewer jobs panel*, showing the progress of eventual active jobs within the viewer (e.g., a loading operation).

The following picture shows a screenshot of LocalEye Viewer's GUI, with the main panels clearly shown:

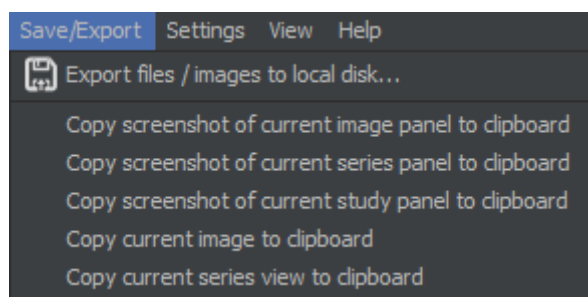


The following sections provide a detailed description of each element of the GUI, as well as of the related features.

## 4 Main menu

### 4.1 Save/Export

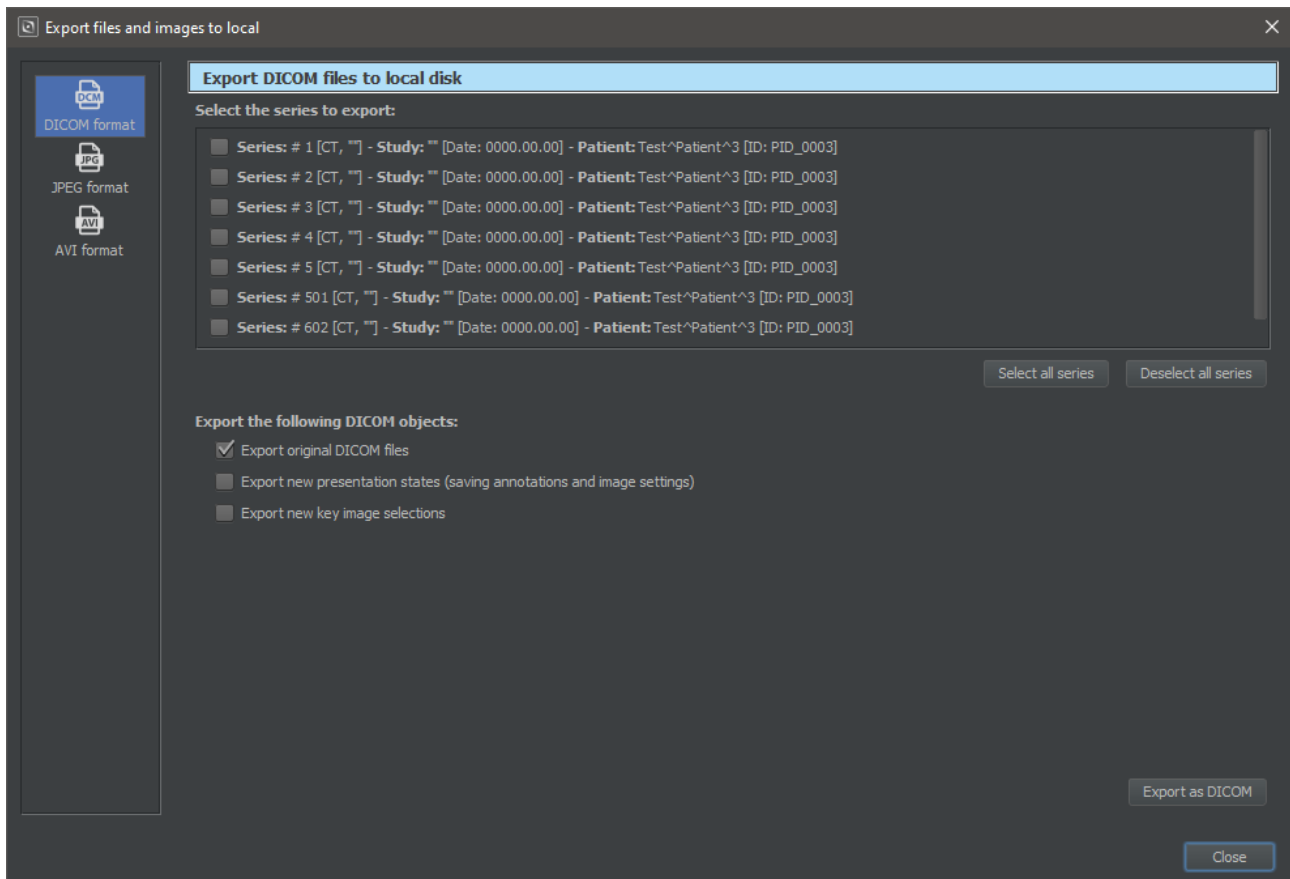
Here is a screenshot of the *Save/Export* menu:



The functions reachable through this menu allow exporting content (typically, images, but also other DICOM content) outside of the viewer application.

#### 4.1.1 Exporting to local disk...

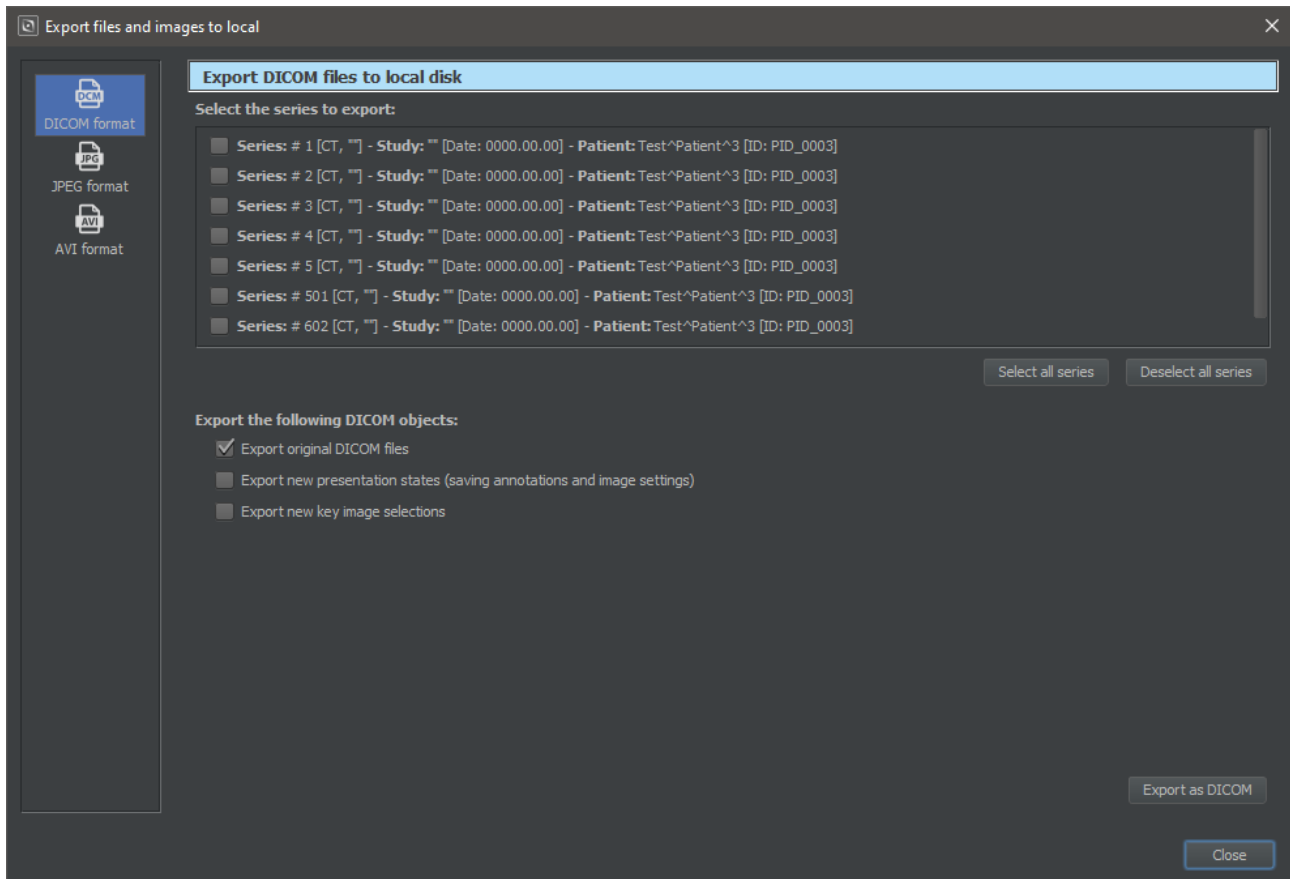
The *Export files / images to local disk...* menu item can be used to export currently-loaded files / images to the local file system or to save to the local file system modifications and settings made on images. If you select the *Export files / images to local disk...* menu item, the *Export files and images to local* dialog box will appear, as shown in the following picture:



Through this dialog, user can select which output format to use for the "export to local disk" operation.

##### 4.1.1.1 Export DICOM files to local disk

The *Export DICOM files to local disk* page can be displayed by selecting the *DICOM format* item from the left-hand list:



This page can be used to export currently-loaded DICOM images to the local file system, or to save to the local file system modifications and settings made on images, through the Presentation State or Key Object Selection DICOM objects.

Through this dialog, user can select which series (among the loaded ones) need to be included in the "export to local" operation.

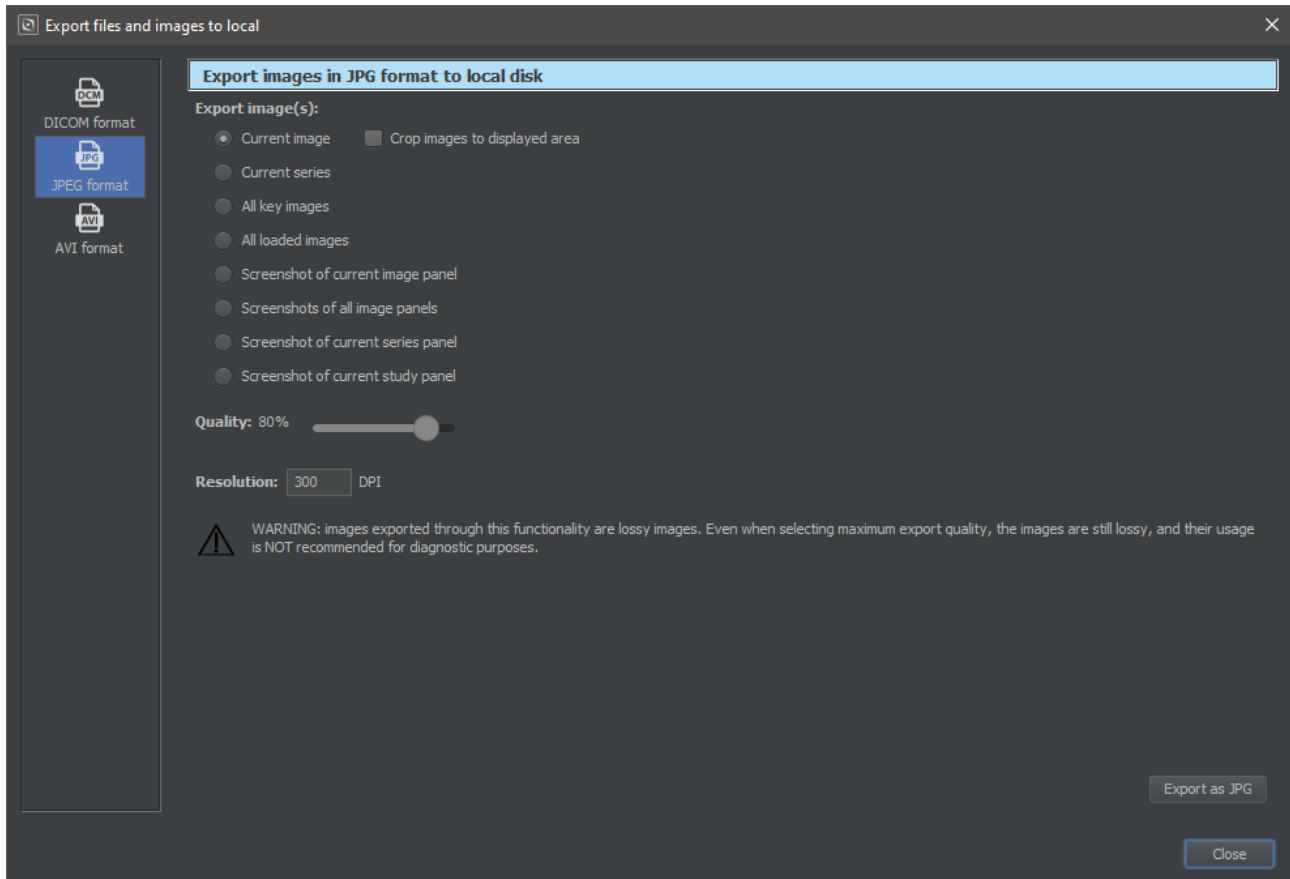
User can also choose to select all series pressing the *Select all series* button or to deselect all series pressing the *Deselect all series* button.

On the *Export DICOM files to local disk* page, you can choose to export the original DICOM files of the series which have been selected in the top list. You can also choose whether to create and export new Presentation States for the selected series. Presentation State objects are able to save and store all settings performed by the user on the medical images, including contrast settings, rotation, flipping, annotations, etc. They don't contain the image, but only the transformations to be applied to images. They are the preferred way to save all modifications and annotations performed on the displayed DICOM images. Usually, the Presentation State files are quite small in size, so the store operation is efficient. In addition, you can choose whether to export the selections of Key Images for the selected series: this option allows supporting persistence of the Key Image information, which can be maintained the next time the study will be loaded.

When the *Export as DICOM* button is pressed, a *Save file* dialog is shown, through which the user will be able to select the path to be used to save the appropriate DICOM files.

#### 4.1.1.2 Export images in JPG format to local disk

The *Export images in JPG format to local disk* page can be displayed by selecting the *JPEG format* item from the left-hand list:



This page can be used to export currently-loaded medical images to the local disk in JPEG format; it allows selecting which images need to be exported in JPEG format, as well as the quality and resolution of the JPEG images to be created.

Also, by selecting the *Crop images to displayed area* option, it is possible to crop images to be exported to the portion which is visible in the currently displayed area. This option is only available when the export selection is set to *Current image* or *Current series*.

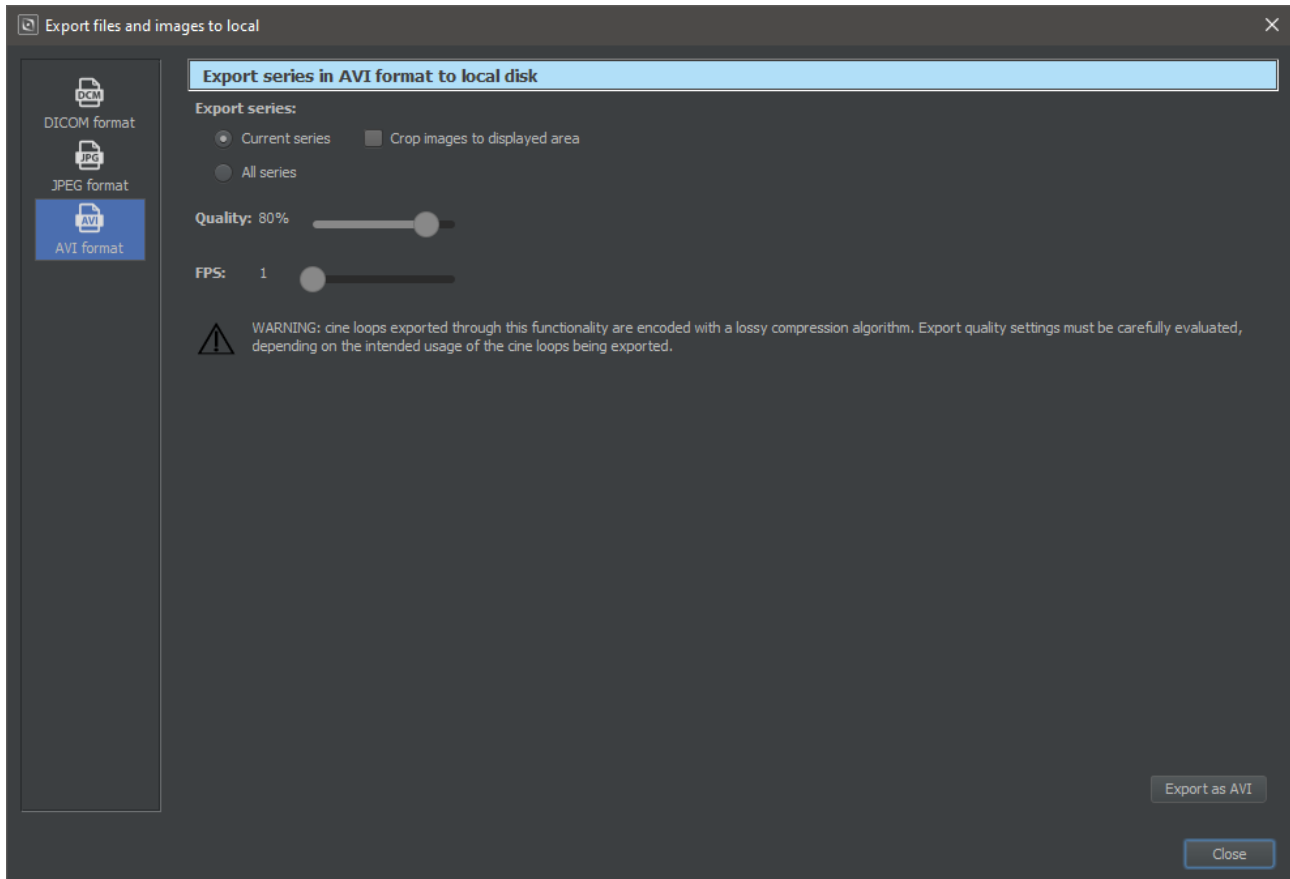
When the *Export as JPG* button is pressed, a *Save file* dialog is shown, through which the user will be able to select the path to be used to save the appropriate JPEG files.



**Warning:** the supported JPEG export format is a *lossy* compression format. Even if a “100 %” quality is specified, the output image is still *lossy*.

#### 4.1.1.3 Export series in AVI format to local disk

The *Export series in AVI format to local disk* page can be displayed by selecting the *AVI format* item from the left-hand list:



This page can be used to export currently-loaded series to the local disk in AVI format, as movies; it allows selecting which series need to be exported in AVI format, as well as quality and frame rate of the AVI movie to be created.

Also, by selecting the *Crop images to displayed area* option, it is possible to crop images to be exported to the portion which is visible in the currently displayed area. This option is only available when the export selection is set to *Current series*.

When the *Export as AVI* button is pressed, a *Save file* dialog is shown, through which the user will be able to select the path to be used to save the appropriate AVI files.

#### 4.1.2 Copying images to the system clipboard

LocalEye Viewer supports a set of *Copy to clipboard* functions, which allow copying medical images to the system clipboard.

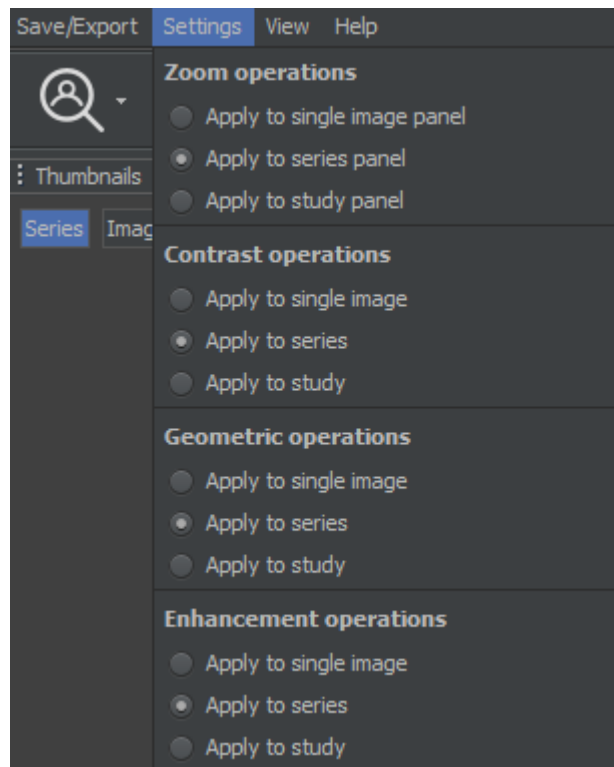
The "Copy screenshot..." set of functions perform a real snapshot of the content of the on-screen display panels, and copy it to the system clipboard. This implies that in this case the images copied to the system clipboard have the same pixel size as the related on-screen display panels, hence they are influenced by the current screen resolution and display mode.

On the other side, the remaining "Copy ... to clipboard" functions copy the medical images to clipboard at their original pixel size / resolution.

The *Ctrl+C* keyboard shortcut may be used to copy a screenshot of the current image panel to the system clipboard.

## 4.2 Settings

Here is a screenshot of the *Settings* menu:

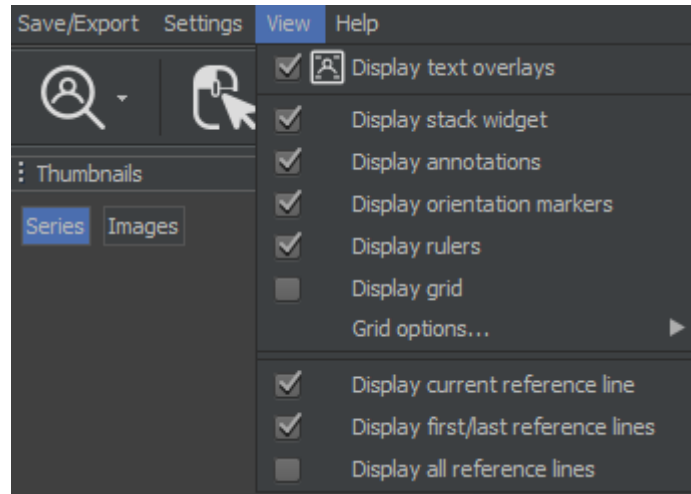


This menu allows directly selecting a set of preferences on the scope of the operations which can be performed on the images.

Zoom operations can be applied to a single image panel, to a series panel or to the study panel; whereas contrast, geometric and enhancement operations can be applied to a single image, to a series or to the entire study, depending on the user's preference.

## 4.3 View

Here is a screenshot of the *View* menu:

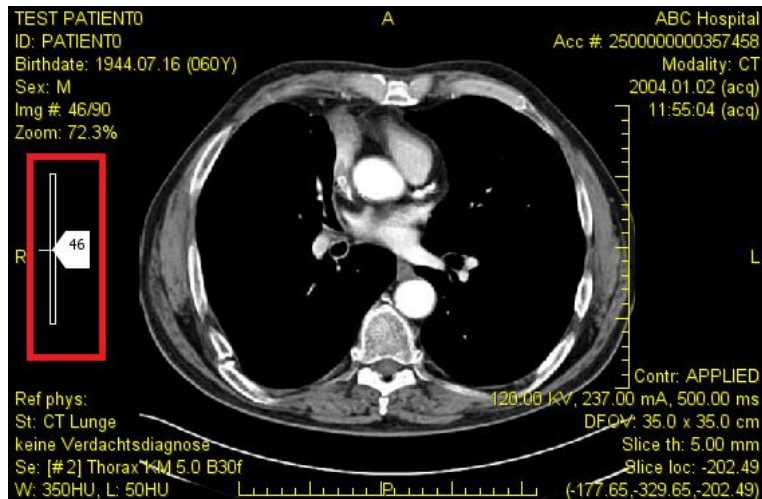


This menu allows specifying several viewing preferences about what shall be displayed and what shall be hidden on the image panels of the viewer.

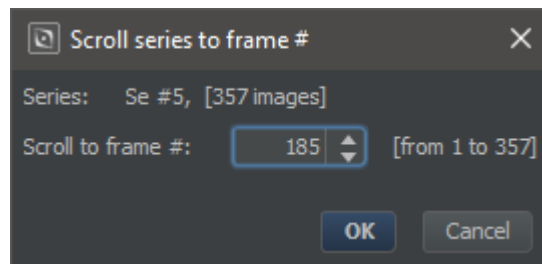
### 4.3.1 Basic viewing preferences

The *Display text overlays* menu item allows enabling and disabling the display of textual overlays on the medical images shown on screen. These text overlays contain fundamental information about each image, such as Patient ID, Patient name, Patient sex, Patient birth date, Study date, Study description, Modality used for acquisition, and other acquisition parameters. These acquisition parameters may sometimes be modality-specific. The specific data fields to include into text overlays related to each kind of image can be entirely configured in the *Text overlays* configuration page of the viewer settings.

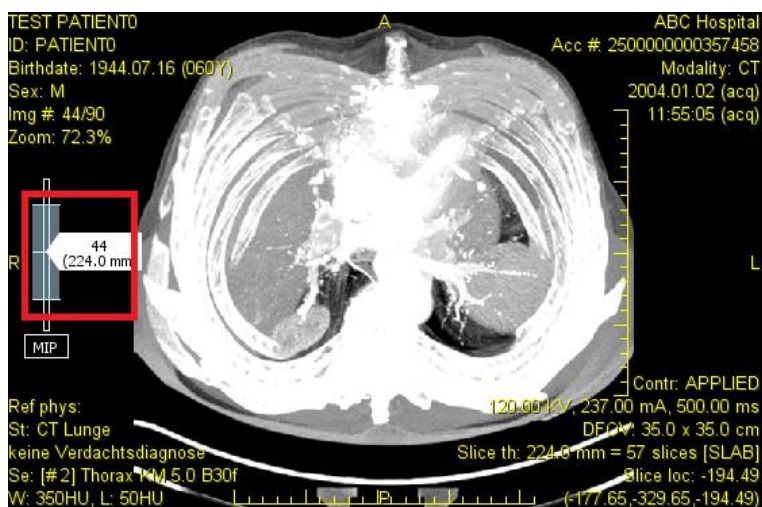
The *Display stack widget* menu item controls display on each image of a widget allowing to quickly scroll across frames of a series, as well as to enable the "thick slab" mode on the original series, as long as the series represents a volume inside the patient's body (typically, CT or MR series):



When the "thick slab" mode is disabled, the user will be allowed to scroll the series by dragging the white cursor labelled with the image number. Moreover, a double click on the cursor will allow the user to manually set the frame he wants to display:

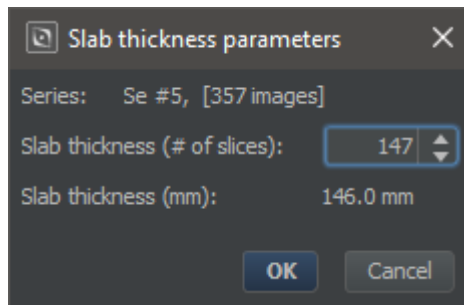


The "thick slab" mode can be enabled by vertically dragging the horizontal line located next to the white cursor:



The thickness of the "thick slab" will vary depending on the dragging operation.

When the "thick slab" mode is enabled, users will be allowed to change the projection algorithm for the slab by clicking on the box located underneath the widget (MIP, AvgIP or MinIP algorithms are available). Thick slab mode can be turned off by double-clicking on the central reference line. Finally, a double click on the horizontal lines which mark the end of the extent of the thick slab on the widget will allow user to manually set the slab thickness parameters:



The *Display annotations* menu item allows enabling and disabling the display of measurement and graphical annotations over all the displayed images.

The *Display orientation markers* menu item allows enabling and disabling the display of orientation markers, normally available on CT and MR images, and sometimes on other kinds of images. If the image orientation information is present inside the related DICOM image file, the orientation markers will be displayed at the four edges of each DICOM image. The orientation will be indicated as:

- A: Anterior
- P: Posterior
- I: Inferior
- S: Superior
- L: Left
- R: Right

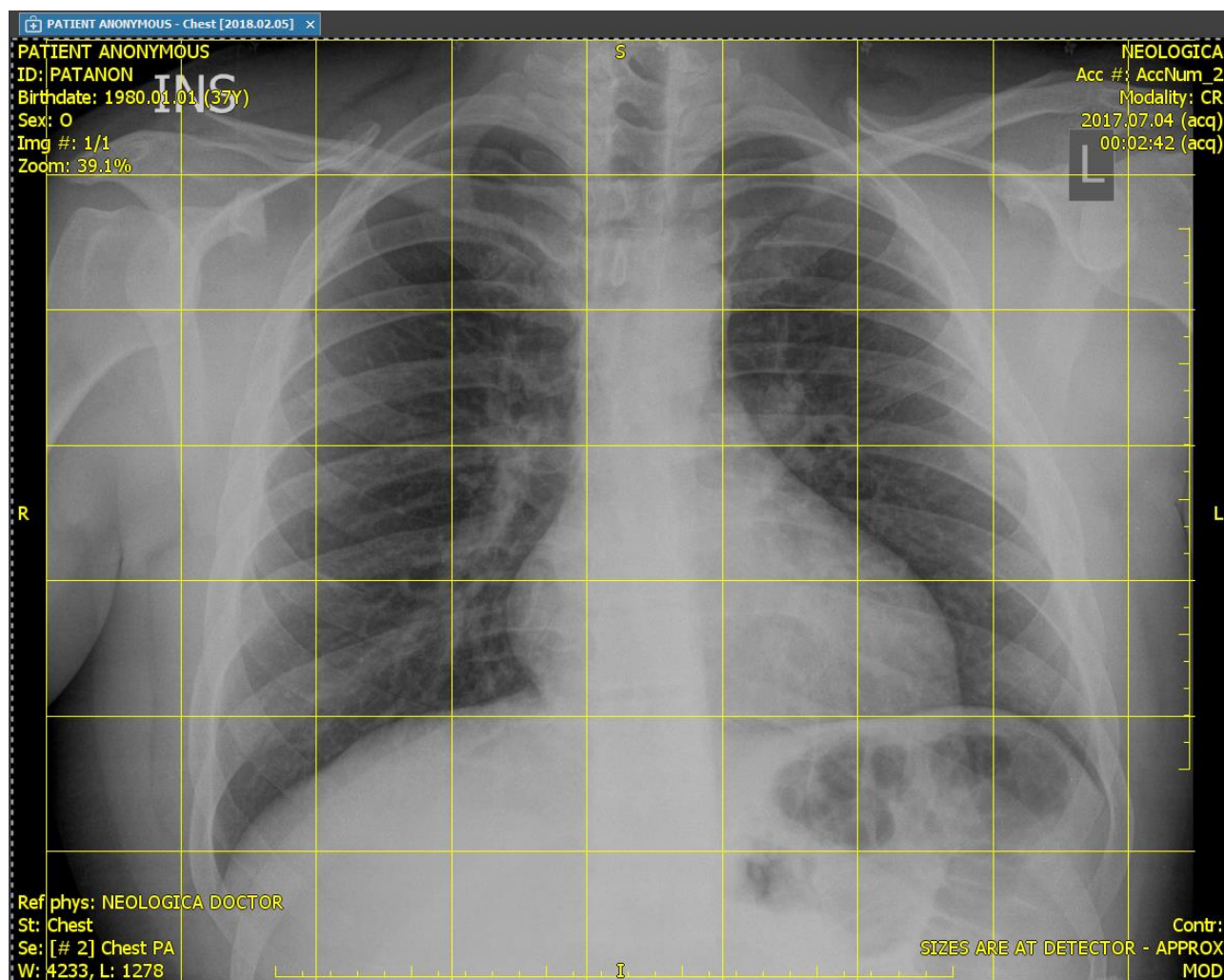


**Warning:** the orientation markers are information generated by a software algorithm. As such, their correctness depends on the correctness of several information stored in the original DICOM datasets, in addition to the correctness of the implemented algorithm. The viewer itself has no mean to ensure these input data are correct. Hence, orientation markers shall be checked and treated in a very "critical" way by the user/radiologist, and any conclusion coming from the orientation markers shall be carefully evaluated.

The *Display rulers* menu item allows enabling and disabling the display of on-screen rulers showing actual distances over the displayed images. The rulers show a short tick every 1 cm on the image, and a longer tick

every 5 cm on the image. Rulers will only be displayed on images having the appropriate calibration information inside the related DICOM image file.

The *Display grid* menu item allows enabling and disabling the display of an on-screen reference grid, which is shown on top of the medical image(s), like this:



The *Grid options* menu item allows setting the distance between consecutive lines (i.e., the *step*) of the grid.

#### 4.3.2 Viewing preferences for reference lines

Reference lines show intersections of the currently-selected image plane with all other image planes shown in the non-selected image panels. Reference lines are only available when the DICOM header provides enough information on the positioning, orientation and pixel spacing of each medical image in the 3D patient-related coordinates system. Normally, this happens for CT and MR images.

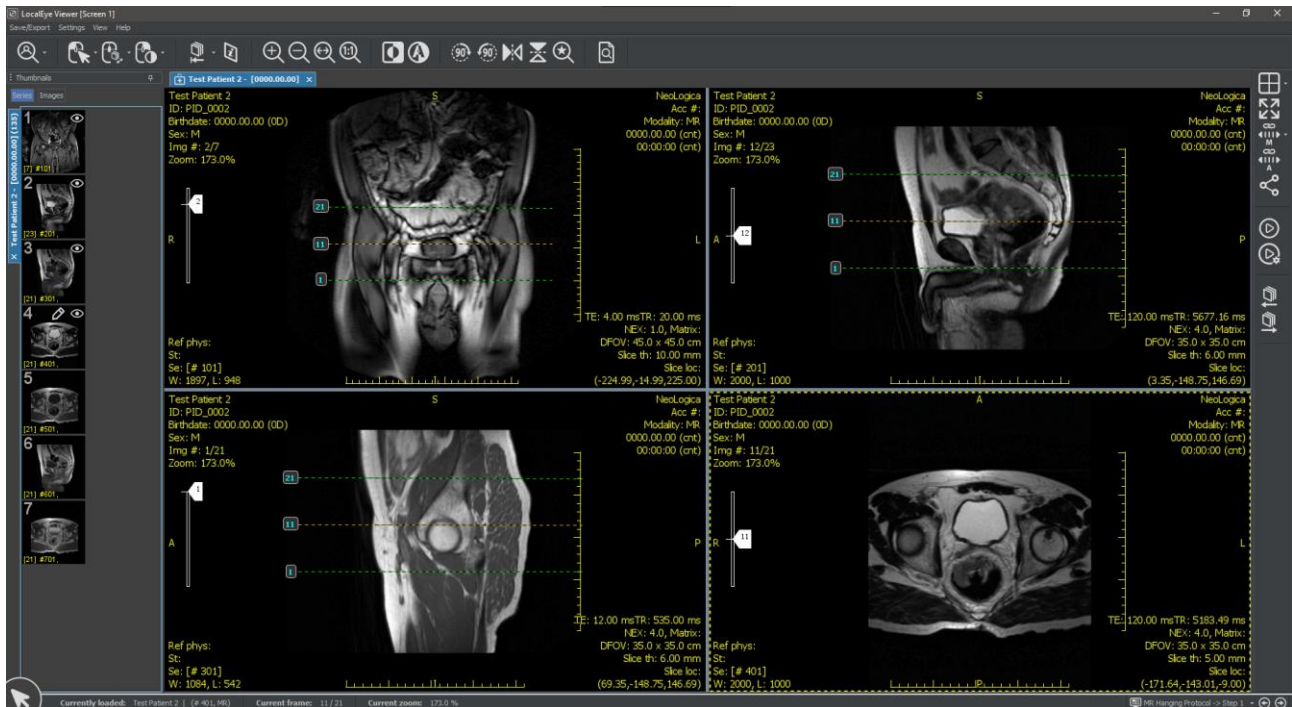
The *Display current reference line* menu item allows enabling and disabling the display of reference lines related to the currently selected image on all other displayed and intersecting series. A reference line

indicates the location of an image slice (the currently selected image) on another image of an intersecting plane.

The *Display first/last reference lines* menu item allows enabling and disabling the display of reference lines related to the first and last image of the currently selected series.

The *Display all reference. lines* menu item allows enabling and disabling the display of reference lines related to all images of the currently selected series.

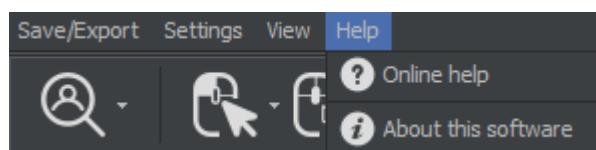
The following picture shows an example of how reference lines look like on a MR study:



**Warning:** reference lines are generated by a software algorithm. The correctness of their location and geometry depends on the correctness of several positioning, orientation and spacing data stored in the original DICOM datasets, in addition to the correctness of the implemented algorithm. The viewer itself has no mean to ensure these input data are correct. Hence, reference lines displayed on the images shall be checked and treated in a very “critical” way by the user/radiologist, and any conclusion coming from reference lines shall be carefully evaluated.

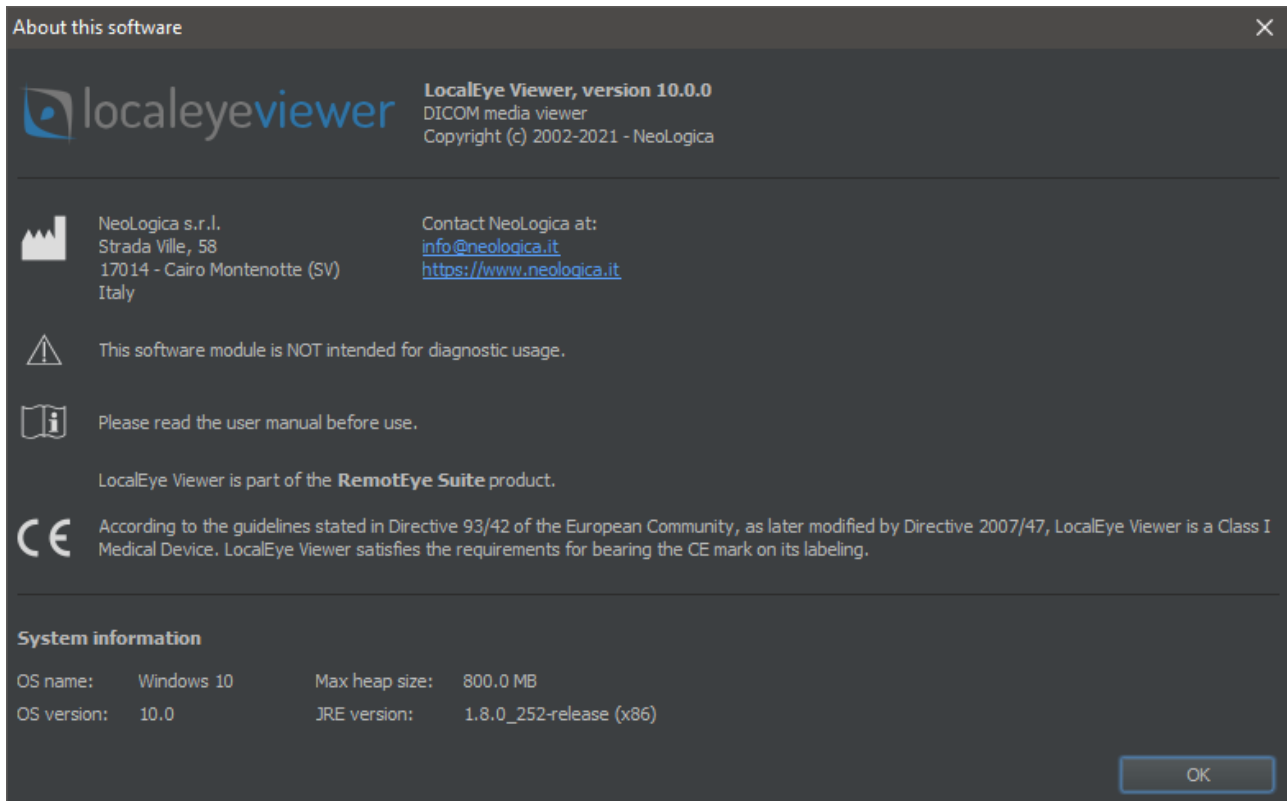
## 4.4 Help

Here is a screenshot of the *Help* menu:



The *Online help* menu item allows accessing the application's user manual. A suitable PDF reading software will need to be available on the client machine in order to ensure proper functionality of this feature.

Pressing the *About this software* menu item, the “*About this software*” dialog box will appear, showing information about the current software version in use:



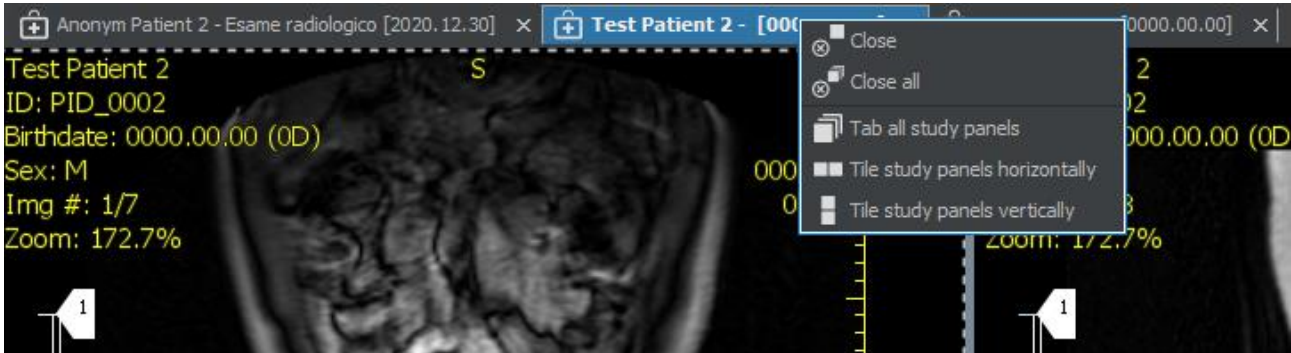
## 5 Study panels

In LocalEye Viewer, each loaded study is displayed in its own dedicated *study panel*, which in turn contains one or more *series panels*. The number and layout of series panels contained in the study panel depends on the *series tiling* setting (i.e., the number of series columns and series rows), which can be set by acting on the appropriate toolbar button, as detailed in the following chapter.

Once the study is open, and several series are displayed on screen, you can maximize a given series (thus switching to 1x1 series tiling and 1x1 image tiling) by double-clicking on it when the *Select/Stack* tool is associated with the double-clicked mouse button. Then, when you are done with this image, you can double-click again on it in order to return to the previous display mode, and all previously displayed images will be restored on screen.

By default, multiple study panels (corresponding to multiple open studies) are arranged in a "tabbed" fashion. However, it is possible to manually drag the tab title of each study panel to arrange and dock the panel according to the user's preference (e.g., in a side-by-side fashion).

In addition, by right-clicking on the tab title related to a study panel, the following drop-down menu will appear:



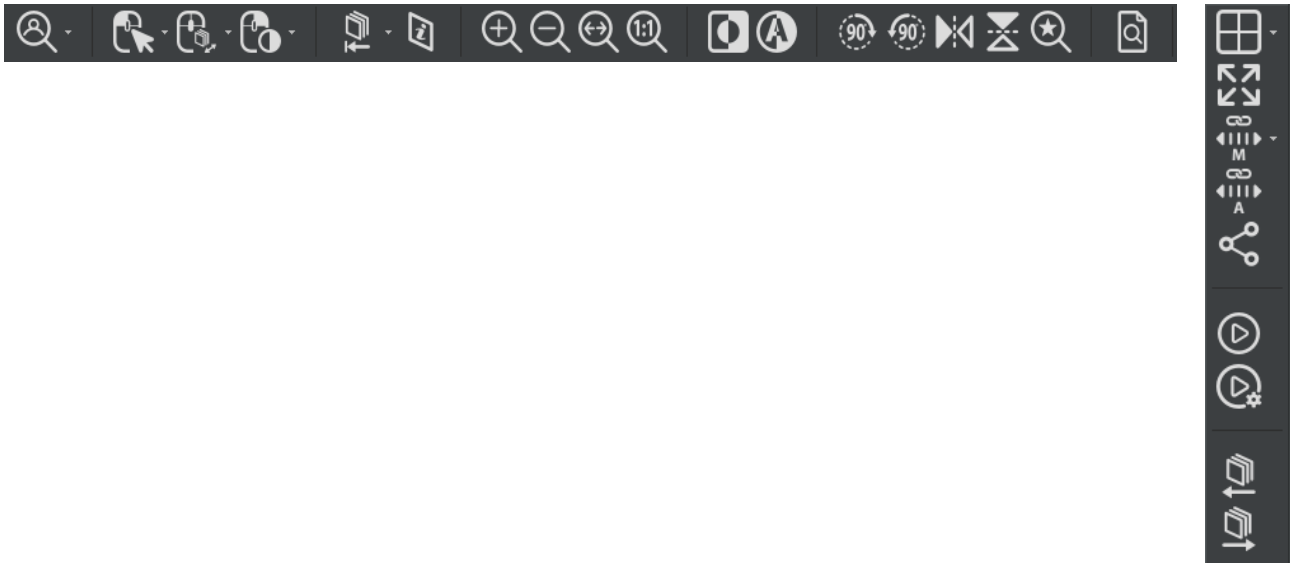
As can you see, this menu allows user to arrange study panels on screen in some different ways: study panels can be grouped together in a tabbed fashion, they can be tiled horizontally or they can be tiled vertically.

## 6 Toolbar actions

Toolbars are now entirely configurable in LocalEye Viewer, through the dedicated section of the *Viewer settings*. Hence, toolbars can contain virtually any button associated with any action defined and available within LocalEye Viewer.

Due to this flexibility, your toolbar(s) may differ also substantially from the toolbars shown in the following sections of this manual. However, the following paragraphs will describe all the main actions which may be typically assigned with toolbar buttons, obviously including the actions associated with the default toolbar buttons configuration.

Here is how the top toolbar and the right toolbar appear in a typical default configuration:



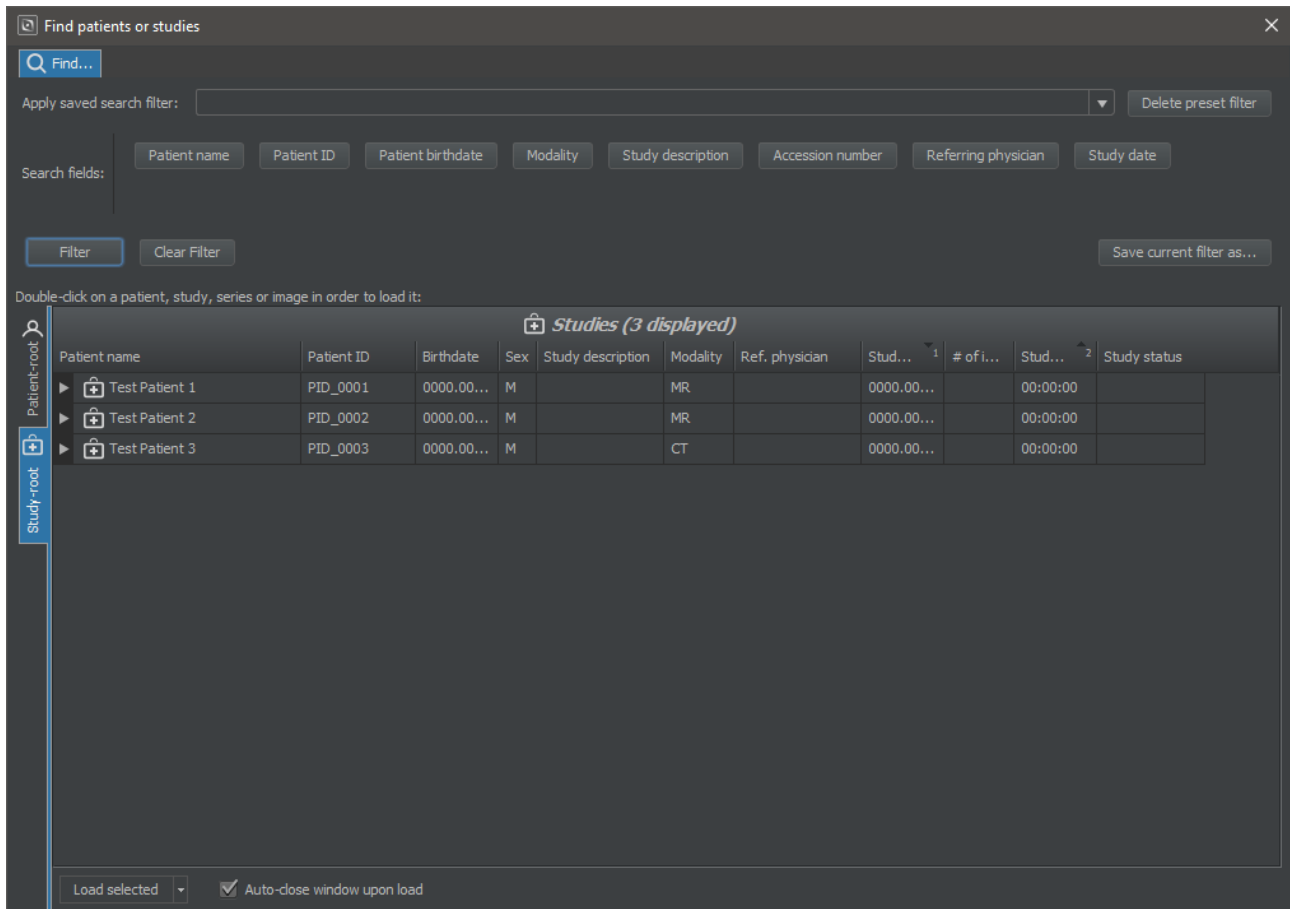
The left toolbar is empty, hence hidden, in the default configuration.

## 6.1 Finding patients / studies



The *Patients / Studies* toolbar button (  ) can be used to search for available patients or studies.

If you press the *Patients / Studies* button, the *Find Patients or Studies* window will appear, as shown in the following picture:



This window shows all available studies, series and images.

Depending on the current user's selection, the tree view may display a “Patient / Study / Series / Image” hierarchy (*Patient-root* view) or a “Study / Series / Image” hierarchy (*Study-root* view).

You can double-click on a patient, study, series or image node (for each operation a message asks how you would like to combine the new loaded studies with the existing ones):

- Double-clicking on a patient node (only possible with *Patient-root* view) will cause loading all studies belonging to that patient. A confirmation for such operation is asked by LocalEye Viewer;
- Double-clicking on a study node will cause loading all series belonging to that study;
- Double-clicking on a series node will cause loading all images belonging to that series;
- Double-clicking on an image node will cause loading just that image.


A powerful search filter is also provided to facilitate the search of a particular patient, study or series.

The user may specify a value for a given search parameter, then press the *Filter* button: the “Patient / Study / Series / Image” hierarchy will be filtered and only those nodes matching the search parameter(s) will be displayed. In particular, the following search parameters are supported:

- *Patient Name*

- *Patient ID*
- *Patient birthdate*
- *Modality*
- *Study Description*
- *Accession Number*
- *Referring Physician*
- *Study Date*
- *Study Status* (*Read, Dictated, Transcribed, Report present, Report complete, Verified* - some study statuses are only available when a specific type of reporting is enabled)
- *Calling AE Title* (only available with the “query” integration model)
- *Called AE Title* (only available with the “query” integration model)

You can apply a previously-saved filter (if any) using the *Apply saved search filter* drop-down list. Also, you can delete the currently-selected filter, with the *Delete preset filter* button.

It is possible to clear/reset all the currently-set search parameters by pressing the *Clear Filter* button. On the other side, you can reset each individual search parameter by pressing the small “X” button () located next to each search field.

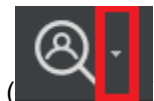
With the *Save current filter as...* button you can save the current set of search parameters, and assign an identifying name to this preset. The newly-saved search filter will be added to the drop-down list located at the top of this *Find* panel.


The *Load selected* button allows loading the selected studies.

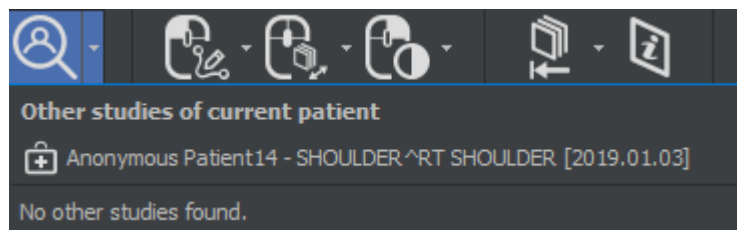
Holding down the *Ctrl* button of the keyboard, you can select several studies at the same time.

If the checkbox *Auto-close window upon load* is checked, the *Find Patients or Studies* window will be automatically closed after a load operation is triggered on this view.

Clicking on the arrow-shaped drop down button located next to the *Patients / Studies* toolbar button



() , a drop down menu containing the other studies (both older and newer) related to the current patient will appear, allowing to speed up the patient's studies search. See the following picture:



## 6.2 Association of tools with mouse buttons


LocalEye Viewer supports a completely flexible association between mouse buttons and image manipulation tools.

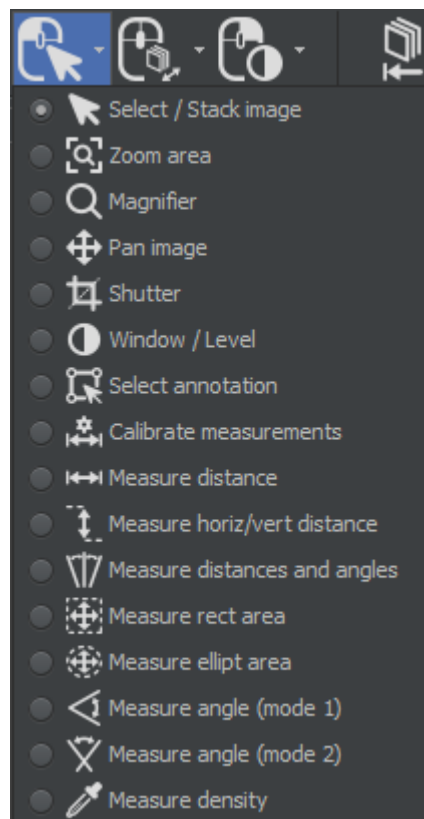
In particular, the following toolbar buttons may be used to associate a tool with the left mouse button, the mouse wheel and the right mouse button:




When moving the mouse pointer over each one of the above toolbar buttons, a tooltip text will appear, providing additional information about the function of the button.



The *Associate tool with LEFT mouse button* toolbar button (  ) can be used to associate an image manipulation tool with the left mouse button. If you press this toolbar button, the following drop-down menu will appear:




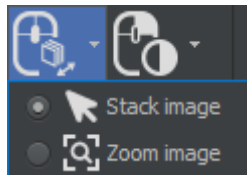


The *Associate tool with RIGHT mouse button* toolbar button (  ) can be used to associate an image manipulation tool with the right mouse button. If you press this toolbar button, the same drop-down menu as above will appear.

Each available image manipulation tool can be independently associated with the left mouse button and with the right mouse button. All combinations of left / right mouse button tools are supported.



The *Associate tool with mouse WHEEL* toolbar button (  ) can be used to associate *Stack image* or *Zoom image* tools with the mouse wheel. If you press this toolbar button, the following drop-down menu will appear:

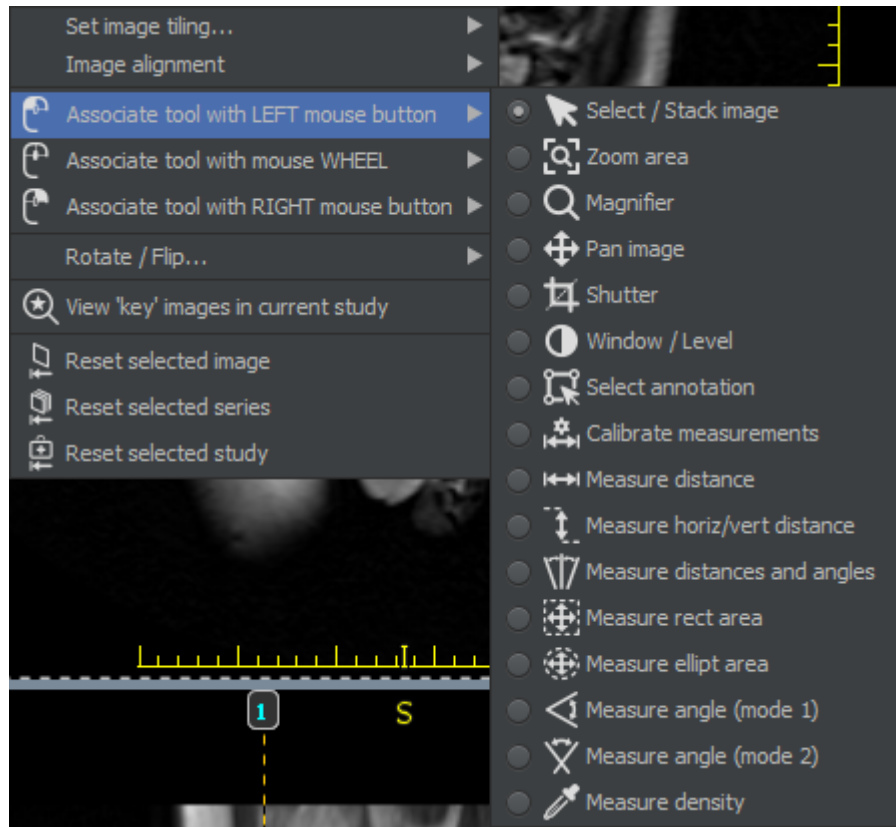


This flexible functionality implies that each single image tool is always usable with a single mouse button. For instance, the *Poly line (annotation)* tool allows drawing a poly-line with a single mouse button; double-click of the associated mouse button must be used to conclude the shape.

The icon of the tool currently associated with the left and right mouse buttons will appear in the next to the left, right and wheel mouse button icons.

In addition to using these toolbar buttons, there are also other ways to associate tools to mouse buttons:

- By CTRL + right-clicking over an image panel, the following contextual menu will appear:



Using the Associate tool with LEFT mouse button, Associate tool with mouse WHEEL and Associate tool with RIGHT mouse button menu items, you are able to change the association between mouse buttons and tools.

- By SHIFT + left-clicking, the viewer directly shows the popup menu to associate a tool with the left mouse button. By SHIFT + right-clicking, the viewer directly shows the popup menu to associate a tool with the right mouse button. By SHIFT + wheel-clicking, the viewer directly shows the popup menu to associate a tool with the mouse wheel.

Each image manipulation tool has its own associated *Tool options* panel. When the user starts using an image manipulation tool on a medical image, that tool becomes the *active tool*, and the *Tool options* panel related to that tool will be displayed in the viewer's bottom bar. Also, the icon of the active tool is displayed in the bottom left corner of the viewer's window:

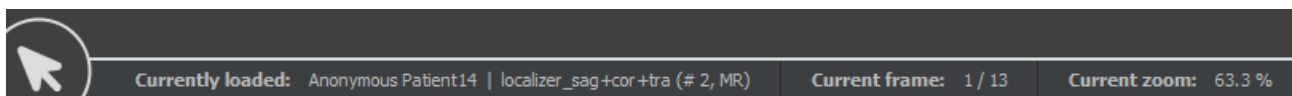


The following paragraphs will describe each image manipulation tool, as well as the options and information available in the *Tool options* panel associated with each tool.

### 6.2.1 Select/Stack image

The *Select/Stack image* tool allows selecting an image panel on a screen, by a single click on the image. To unselect the image you have to click on the image while holding the *Ctrl* key pressed. Also, it is possible to scroll through the images of the series by dragging with the associated mouse button over the image (“stack” operation). It is additionally possible to exploit a ‘Scroll to frame #’ screen action, which can be associated with a keyboard shortcut.

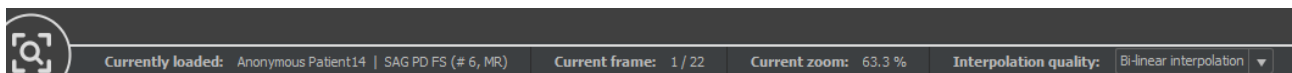
The *Tool options* panel associated with this tool, shown in the picture below, in the viewer’s bottom bar, displays basic information about the currently selected image.



### 6.2.2 Zoom area

The *Zoom area* tool allows zooming a specific rectangular portion of the currently selected image. The rectangular region to be zoomed can be selected by dragging with the associated mouse button over the medical image (single drag operation to define the boundaries of the rectangular area to zoom). If the *SHIFT* key of the keyboard is kept pressed, then the area to zoom will be forced to a square shape.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer’s bottom bar:

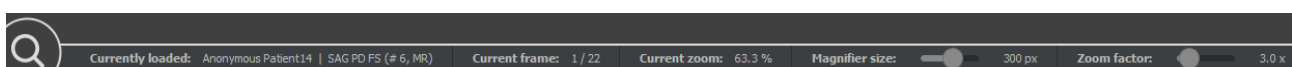


The interpolation algorithm used to zoom images can be chosen through the *Interpolation quality* drop-down list on the *Tool options* panel associated with this tool. Three different interpolation types are supported, providing a speed vs quality trade-off.

### 6.2.3 Magnifier

The *Magnifier* tool allows magnifying a moving portion of the image, by dragging with the associated mouse button over the image.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer’s bottom bar:

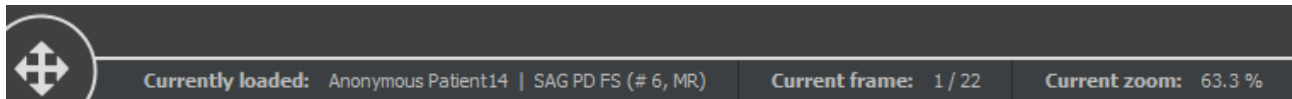


The magnification factor used by the magnifier, as well as the size of the magnifier itself, can be modified by dragging the *Zoom factor* and the *Magnifier size* sliders on the *Tool options* panel associated with this tool.

#### 6.2.4 Pan image

The *Pan image* tool allows panning over the currently selected image, by dragging with the associated mouse button over the image.

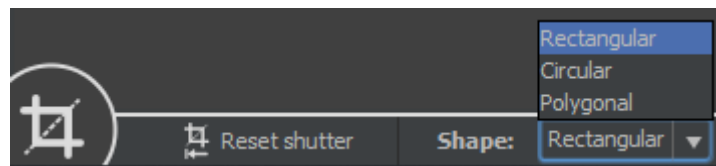
The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



#### 6.2.5 Shutter

The *Shutter* tool allows applying a shutter over the image, i.e., hiding a sub-region of the image, which is not interesting for medical purposes. The shutter is always applied to the entire series.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



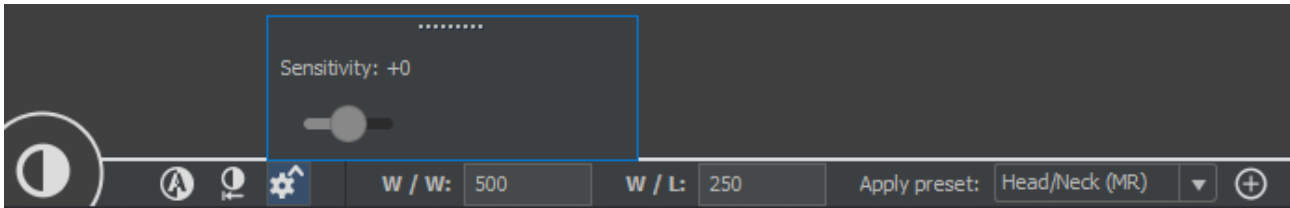
You can select the shape of the shutter to apply on the series by selecting the appropriate *Shape* option in this panel. In order to draw a Rectangular or Circular shutter, it is sufficient to select the *Shutter* tool, to drag with the associated mouse button over the image, and then to release the mouse button when you are satisfied with the size of the shutter. On the other side, if you want to draw a Polygonal shutter, then you need to click the associated mouse button on every point of the polygon contour that you want to define. When you want to define the last point of the contour, double-click the associated mouse button, and the polygonal shutter will complete (i.e., close the polygon) automatically.

#### 6.2.6 Window / Level

The *Window / Level* tool allows modifying the window width and window level values (also known as "window center") for the gray levels (or colors) of the current image. The Window / Level values are given in Hounsfield Units if the selected image panel contains a CT image.

You may change the Window, Level values by dragging with the associated mouse button over the image.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



It is possible to change the sensitivity of mouse dragging movements for contrast changes, by dragging the *Sensitivity* slider in this panel.

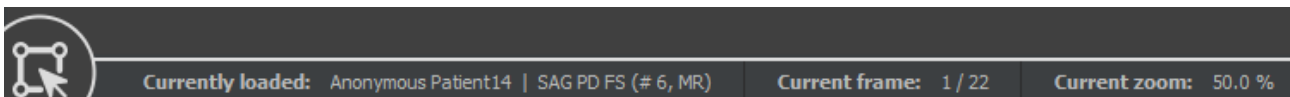
Window width and window level values can also be changed by selecting one of the available contrast presets (from the *Presets* drop-down list). Finally, you can manually enter window/level values in the *W / W* and *W / L* text fields, and press *Enter* on your keyboard to confirm and apply them.

Press the *Auto window* button (🔍) in order to apply an automatic “optimal” windowing for the currently selected image. The *Reset W/L to default* button (🔄) may be used to restore the original Window / Level setting suggested in the DICOM data set (if present).

### 6.2.7 Select annotation

The *Select annotation* tool allows selecting a measurement or graphical annotation which already exists on the current medical image. Selection of the annotation shape is done by clicking with the associated mouse button over the annotation shape itself. Once the annotation is selected, it is possible to move and modify the shape itself, by dragging with the associated mouse button over specific points of the selected annotation shape. If dragging is started over one of the displayed selection handles (the small red squares), then the shape will be modified, by moving the relevant selection handle point. On the other side, if dragging is started over a generic point of the shape (i.e., not over a selection handle), then the entire annotation is moved, with no modifications to its geometric shape.

The generic *Tool options* panel associated with this tool is shown in the picture below, in the viewer’s bottom bar:



Once a measurement or graphical annotation shape is selected, the Tool options panel will reflect the properties of the specific selected shape, and will offer more options. Also, when an annotation is selected, you can delete it by pressing the *Delete* key on the keyboard, or the *Delete* button in the *Tool options* panel. Finally, once an annotation is selected, you can select the previous or next annotation of the current image by pressing the ‘-’ or ‘+’ keys on the numeric keypad of your keyboard.

### 6.2.8 Measurement tools

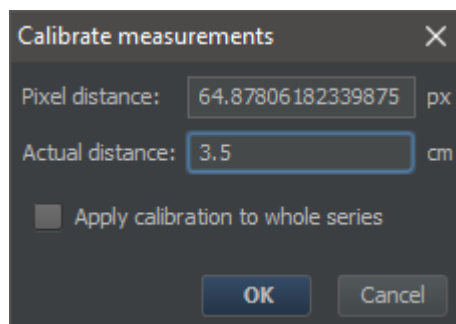
LocalEye Viewer supports several measurements tools, described in the following sub-paragraphs.



**Warning:** measurements taken through the LocalEye Viewer software are based on pixel-to-millimetres calibration information which is read from the DICOM dataset. This calibration information is stored by the modality which originally acquired the medical images. LocalEye Viewer has no mean to guarantee that the calibration information is correct and accurate, hence it has no mean to guarantee that the final measurements taken by the software are actually accurate. It is recommended that the user of LocalEye Viewer critically checks the result of each measurement.

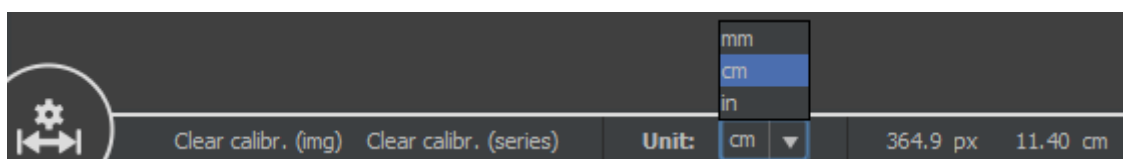
#### 6.2.8.1 Calibrate measurements

The *Calibrate measurements* tool allows calibrating distances, that is, assigning an actual known distance value (in mm, cm or inches) to a given distance measured on-screen, over the image. In order to perform calibration, select the *Calibrate measurements* tool and drag with the associated mouse button over the image, on the distance that you want to calibrate / set. As soon as the drag operation has finished, the *Calibrate measurements* dialog will appear:



User needs to enter the *Actual distance* corresponding to the measured *Pixel distance*. User also has the option of specifying that the following calibration must be applied to the whole series, that is, to all images belonging to the current series. If this option is not checked, then the calibration will only be applied to the DICOM file containing the current image.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:

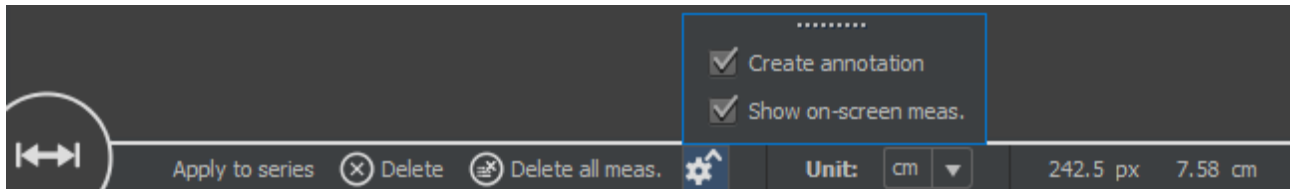


This panel basically allows you to modify the measurement unit used for calibration.

### 6.2.8.2 Measure distance

The *Measure distance* tool allows measuring linear distances on the selected medical image. The measurement is performed by dragging with the associated mouse button over the image, and releasing the mouse button once you traced the distance that you want to measure.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



The user may choose to create an *annotation* of each measurement, thus leaving a persistent graphic object over the image, by enabling the *Create annotation* checkbox. In addition, the user may choose to add the drawn measurement annotations to all images of the current series, by pressing the *Apply to series* toggle button. If the *Create annotation* option is disabled, the graphic object representing the current measurement over the image will immediately disappear when the measurement is complete (i.e., the mouse button is released).

The user may also choose whether to display an on-screen label of each performed measurement, by checking or unchecking the *Show on-screen meas.* option.

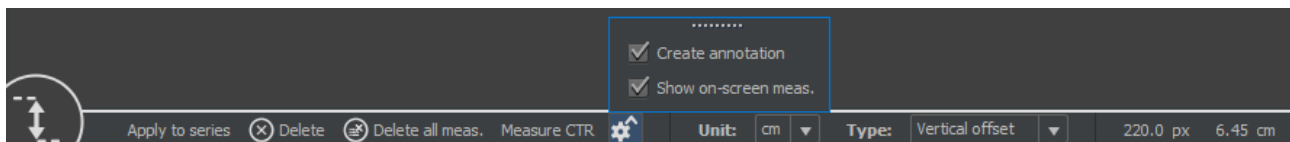
The measurement unit used for measurements may be chosen by selecting the corresponding option (*mm*, *cm*, or *in*) in the *Unit* drop-down list of this *Tool options* panel.

Finally, it is possible to delete the currently selected annotation by pressing the *Delete* button, or to delete all measurement annotations by pressing the *Delete all meas.*

### 6.2.8.3 Measure horiz/vert distance

The *Measure horiz / vert distance* tool allows measuring linear horizontal or vertical distances on the selected medical image. The measurement is performed by dragging with the associated mouse button over the image, starting the dragging operation on the start point and releasing the mouse button on the end point of the vertical or horizontal distance that you want to measure.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



The user may choose whether he wants to compute the horizontal offset (i.e., horizontal distance) or the vertical offset (i.e., vertical distance) between the start and end point which have been identified through the mouse drag operation, by acting on the *Type* drop-down box.

### Computation of the Cardio-Thoracic Ratio (CTR)

The *Measure horiz / vert distance* tool allows computing the value of the Cardio-Thoracic Ratio. Once the appropriate chest xray image is selected, just select *Horizontal offset* in the *Type* drop-down of the *Tool options* panel. Take a first horizontal distance measurement corresponding with the cardiac size, then a second horizontal distance measurement corresponding with the maximum width of the thoracic cavity. Finally, press the *Measure CTR* button, and you will get the value of CTR. According to literature, a value of CTR above 50% is considered abnormal.

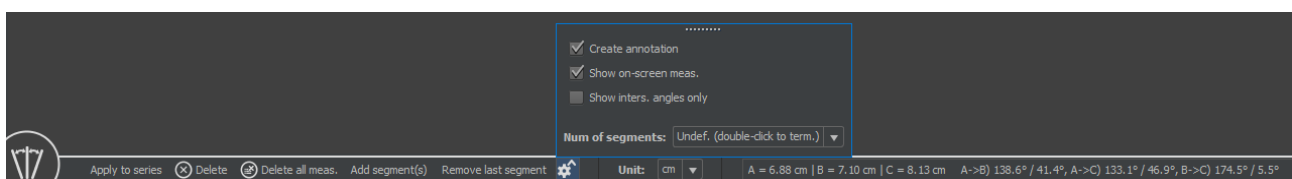


**Warning:** in order to guarantee maximum accuracy, it is recommended that the *Measure CTR* tool is only used on a PA (Posterior - Anterior) chest xray image.

#### 6.2.8.4 Measure distances and angles

The *Measure distances and angles* tool allows measuring angles among an arbitrary number of segments, which may be intersecting or not. Also, the distances represented by each segment are computed and displayed. The measurement is performed by dragging with the associated mouse button over the image, in order to trace each segment. A double-click with the associated mouse button will terminate the sequence of segments. Once the sequence is terminated, all distances and angles will be computed and shown.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



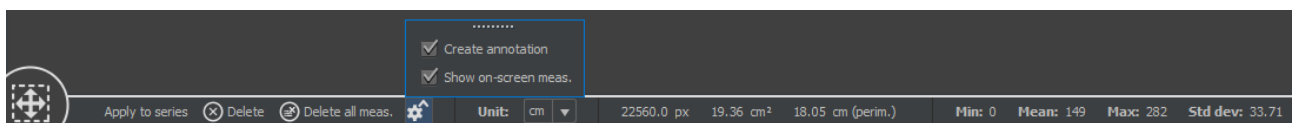
The user may choose whether he wants only angles among intersecting segments are computed and shown, by checking the *Show inters. angles only* option. Also, it is possible to set the number of segments in a sequence to a fixed value, by acting on the *Num of segments* drop-down box: this will eliminate the need for a double-click to terminate the sequence, as the sequence will be automatically terminated once the just-set number of segments will be traced.

Each sequence of segments is independent from other sequences, even on a single image. Once a sequence is terminated, it can still be modified both in terms of position of each single segment and in terms of number of segments: this last aspect can be managed by acting on the *Add segment(s)* and *Remove last segment* buttons (a sequence must be selected first).

### 6.2.8.5 Measure rect area

The *Measure rect area* tool allows measuring rectangular areas on the selected medical image. Information about the surface, the perimeter, the minimum/maximum/mean density, and the standard deviation of the densities within the rectangular area is provided. The measurement is performed by dragging with the associated mouse button over the image, and releasing the mouse button once you traced the rectangular area that you want to measure. Keeping the *Shift* key of the keyboard pressed will force the area to be exactly square.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



Please refer to the paragraph about the *Measure distance* tool for an explanation of the options available in this panel.

In addition, as shown in the following screenshots, on PET images containing the appropriate data elements in their DICOM dataset, LocalEye Viewer is able to provide the minimum/maximum/mean SUV, and the standard deviation of the SUV within the selected rectangular area.



SUV (Standardized Uptake Values) is commonly used in PET image analysis. It measures the concentration of a radiotracer in a defined region of interest (ROI), which provides interesting diagnostic information. In particular, LocalEye Viewer computes SUV according to the "SUV Body Weight" algorithm which is based on the following formula:

$$\text{suvValue}[\text{body weight}] = (\text{activityConcentration} / (\text{radionuclTotalDoseBq} * \text{decayFactor})) * \text{patientWeightG}$$

where:

- activityConcentration: the pixel value in the image, after processing of Modality LUT.
- radionuclTotalDoseBq: the radionuclide total dose, expressed in Bequerels.

- decayFactor: the decay factor.
- patientWeightG: the patient's weight, expressed in grams.



**Warning 1:** computation of SUV in LocalEye Viewer is based on generally accepted methods and equations, and in particular on the Body Weight equation reported above. However, some institutions may use methods and/or equations that differ from those used by LocalEye Viewer and described in this user manual. Prior to use in a clinical environment, it is important that all equations be confirmed and an independent evaluation be conducted of the SUV values reported by LocalEye Viewer with studies from all PET acquisition devices present at your facility, under typical acquisition conditions.



**Warning 2:** LocalEye Viewer computes SUV only based on the information stored in the image's DICOM dataset. It is the modality technician's responsibility to ensure that all information is correct and accurate. LocalEye Viewer won't compute SUV if some of the data elements which are used to compute SUV are not present or empty in the DICOM dataset.

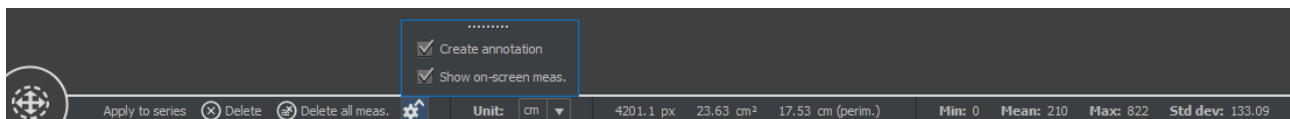


**Warning 3:** LocalEye Viewer does not compute SUV on images that have not been decay-corrected by the acquisition device, because the computed SUV value would not be reliable in that case.

#### 6.2.8.6 Measure ellipt area

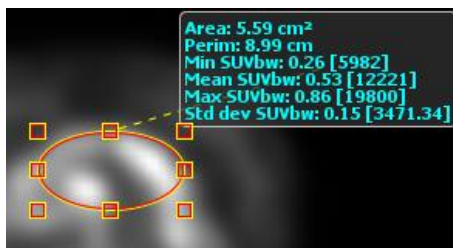
The *Measure ellipt area* tool allows measuring elliptical areas on the selected medical image. Information about the surface, the perimeter, the minimum/maximum/mean density, and the standard deviation of the densities within the elliptical area is provided. The measurement is performed by dragging with the associated mouse button over the image, and releasing the mouse button once you traced the elliptical area that you want to measure. Keeping the *Shift* key of the keyboard pressed will force the area to be exactly circular.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



Please refer to the paragraph of the *Measure distance* tool for an explanation of the options available in this panel.

In addition, as shown in the following screenshots, on PET images containing the appropriate data elements in their DICOM dataset, LocalEye Viewer is able to provide the minimum/maximum/mean SUV, and the standard deviation of the SUV within the selected elliptical area.

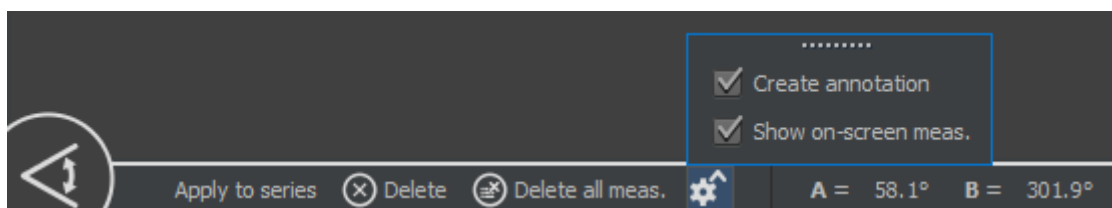


Please refer to the previous paragraph "*Measure rect area*" for details and recommendations about SUV (Standardized Uptake Values).

#### 6.2.8.7 *Measure angle (mode 1)*

The *Measure angle (mode 1)* tool allows measuring angles on the selected medical image. The measurement is performed by clicking three times with the associated mouse button over the image; each click identifies one of the three points defining the angle to be measured.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:

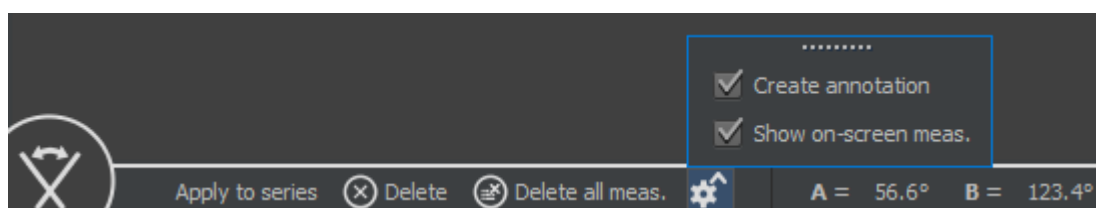


Please refer to the paragraph of the *Measure distance* tool for an explanation of the options available in this panel.

#### 6.2.8.8 *Measure angle (mode 2)*

The *Measure angle (mode 2)* tool allows measuring angles on the selected medical image. The measurement is performed by drawing two segments over the image; each segment can be drawn by dragging with the associated mouse button over the image, and releasing it when each segment has the desired properties.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



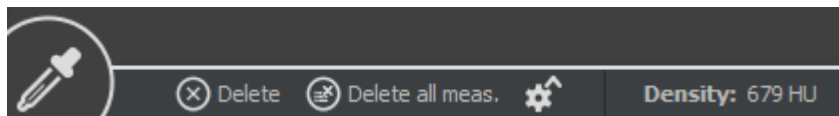
Please refer to the paragraph of the *Measure distance* tool for an explanation of the options available in this panel.

#### 6.2.8.9 Measure density

The *Measure density* tool allows measuring densities on the selected medical image.

The measurement is performed by dragging with the associated mouse button over the image. Once the mouse button is released, the density measurement is eliminated.

The *Tool options* panel associated with this tool is shown in the picture below, in the viewer's bottom bar:



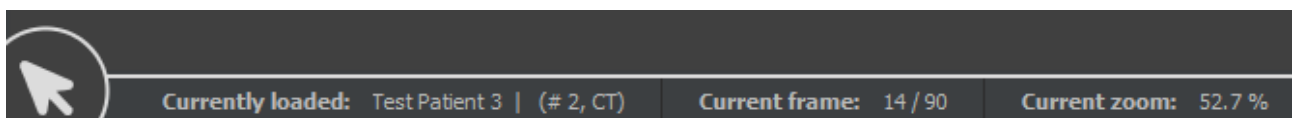
Moreover, on PET images containing the appropriate data elements in their DICOM dataset, LocalEye Viewer is able to provide the SUV for each point which is selected on the image. The value provided in square brackets is the actual detected pixel value, after modality LUT transformation.



Please refer to the paragraph "*Measure rect area*" for details and recommendations about SUV (Standardized Uptake Values).

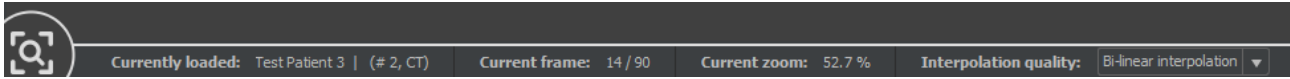
#### 6.2.9 Stack image (mouse wheel)

If the *Stack Image* tool is associated with the mouse wheel, scrolling the mouse wheel will cause scrolling the images of the current series (equivalent to *Previous frame* and *Next frame* buttons optionally available in the Series toolbar, depending on the viewer configuration). If the *Alt* key on the keyboard is kept pressed while scrolling the mouse wheel, a scrolling of the current scene (i.e., page of images) will happen (equivalent to *Previous scene* and *Next scene* buttons optionally available in the Series toolbar, depending on the viewer configuration).



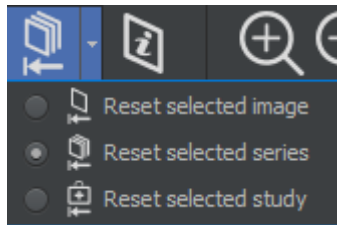
### 6.2.10 Zoom image (mouse wheel)

If the *Zoom Image* tool is associated with the mouse wheel, scrolling the mouse wheel will cause a zoom in or zoom out operation (depending on the direction of wheel rotation) on the current image.



## 6.3 Resetting operations on images

The following toolbar button may be used to reset all changes done on the current image, on all images of the current series, or on all images of the current study:



More specifically, the "reset" toolbar button above may correspond with the Reset selected image, or with the Reset selected series, or with the Reset selected study action, depending on which item is selected in the related drop-down menu, which can be shown by pressing the down arrow next to the "reset" toolbar button, as visible in the screenshot above.

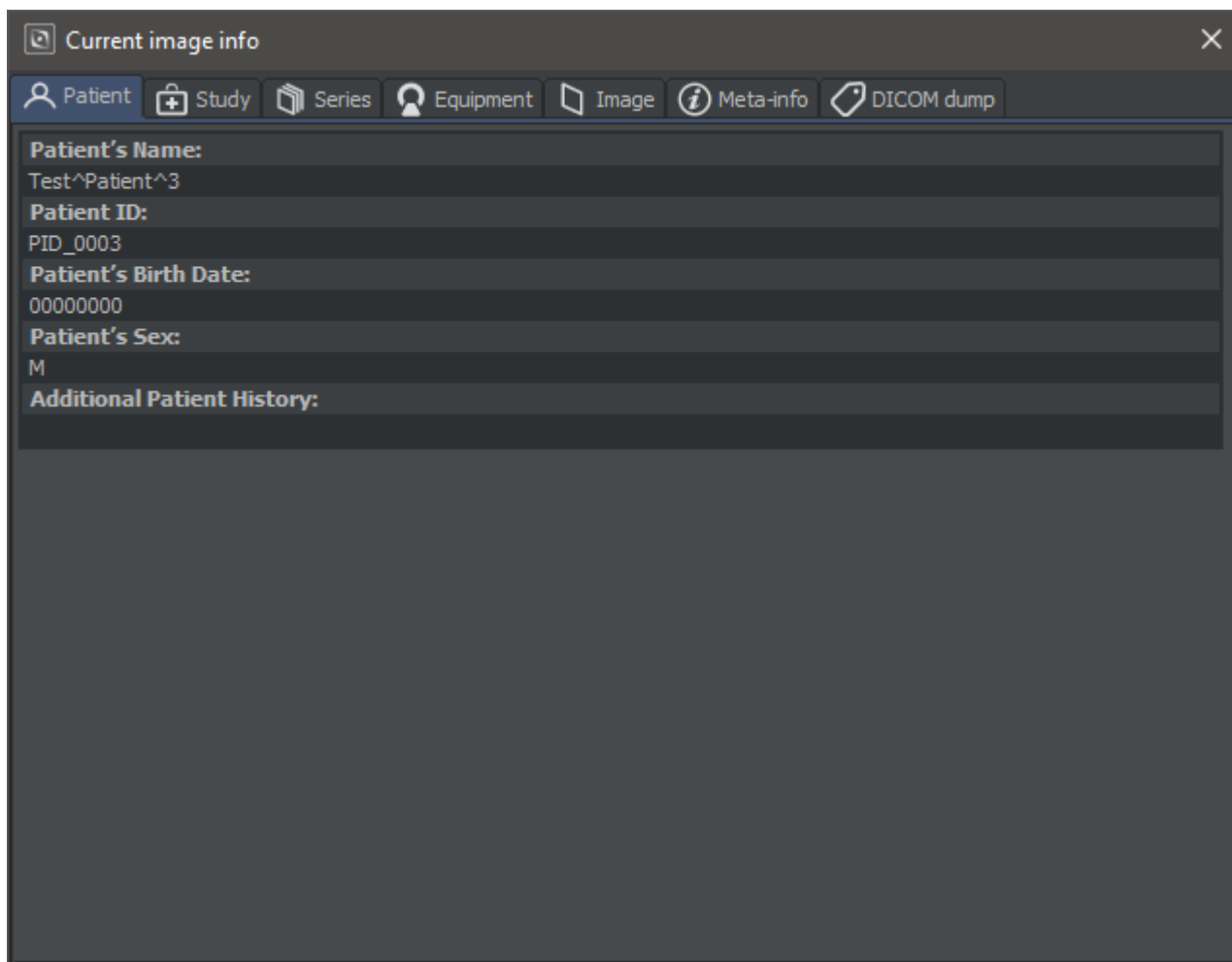
Here is a short description of each Reset operation available:

- *Reset selected image*: all changes and operations performed on the currently selected image will be reset.
- *Reset selected series*: all changes and operations performed on the current series will be reset.
- *Reset selected study*: all changes and operations performed on the current study will be reset.

## 6.4 Showing image information



The *Show image information* toolbar button (  ) allows viewing information about the currently selected image. If you press this toolbar button, the *Current Image Info* dialog box will appear:



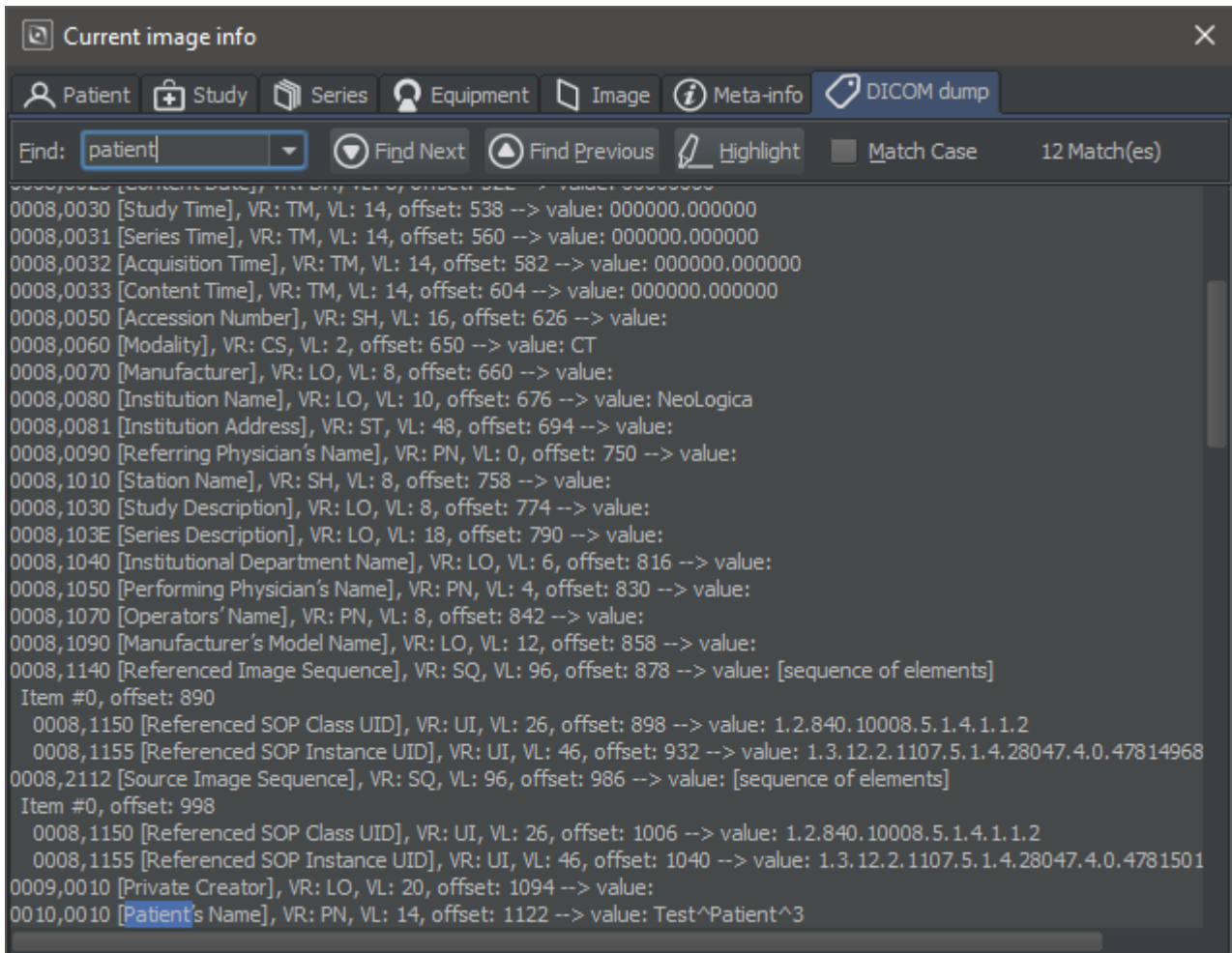
This dialog box is composed of several tabs:

- *Patient tab*
- *Study tab*
- *Series tab*
- *Equipment tab*
- *Image tab*
- *Clinical Trial tab* (if enabled)
- *Meta-Info tab*
- *DICOM dump tab*

These tabs display information extracted from the current DICOM file, i.e., the DICOM file related to the currently selected image.

In particular, the *DICOM dump* tab allows performing the DICOM dump of the selected image or of a file not open in LocalEye Viewer, dragging it in the "dump area". In this second instance, the DICOM dump could be a useful diagnostic tool, when, for some reason, is impossible opening the file.

The DICOM dump, indeed, shows all the DICOM data elements related to the selected file/image.



A search box is also supported, allowing to easily find information in the DICOM dataset dump.

## 6.5 Zooming images

Several zoom-related operations are available as toolbar buttons, as shown in the screenshot below:




When moving the mouse pointer over each single zoom button, a tooltip text will appear, providing additional information about the function of the underlying button.

The following paragraphs will describe each zoom operation tool.

### 6.5.1 Zoom in



Pressing the *Zoom in* toolbar button (  ) the image displayed in the current panel will be zoomed in.

### 6.5.2 Zoom out



Pressing the *Zoom out* toolbar button (  ) the image displayed in the current panel will be zoomed out.


### 6.5.3 Zoom to fit



Pressing the *Zoom to fit* toolbar button (  ) the image displayed in the current panel will be zoomed to fit the size of the panel itself.

### 6.5.4 Zoom reset



Pressing the *Zoom reset* toolbar button (  ) the image displayed in the current panel will be set at zoom 100%, i.e., at its original pixel size.

## 6.6 Managing image contrast

Several contrast management operations are available as toolbar buttons, as shown in the screenshot below:




When moving the mouse pointer over each single contrast management button, a tooltip text will appear, providing additional information about the function of the underlying button.

The following paragraphs will describe each contrast management operation, corresponding with each button.


### 6.6.1 *Invert*



Pressing the *Invert* toolbar button (  ) all images of the current series will be contrast-inverted. In other words, the images are transformed into their “negative” images.

### 6.6.2 *Auto window*



Pressing the *Auto window* toolbar button (  ) all images of the current series will be auto-windowed. In other words, an automatic “optimal” contrast windowing will be applied to images.

## 6.7 *Rotating and flipping images*

Several geometric transformation operations (i.e., rotation and flipping) are available as toolbar buttons, as shown in the screenshot below:



When moving the mouse pointer over each single geometric transformation button, a tooltip text will appear, providing additional information about the function of the underlying button.

The following paragraphs will describe each geometric transformation operation, corresponding with each button.

### 6.7.1 *Rotate +90°*



Pressing the *Rotate +90°* toolbar button (  ) all images of the current series will be rotated clockwise of 90 degrees.


### 6.7.2 Rotate -90°



Pressing the *Rotate -90°* toolbar button (  ) all images of the current series will be rotated counter-clockwise of 90 degrees.

### 6.7.3 Flip horizontally



Pressing the *Flip horizontally* toolbar button (  ) all images of the current series will be flipped horizontally.

### 6.7.4 Flip vertically



Pressing the *Flip vertically* toolbar button (  ) all images of the current series will be flipped vertically.


## 6.8 Managing key images

LocalEye Viewer supports functionalities to display all images marked as key images within the current study. All these functions are available as toolbar buttons, as shown in the screenshot below:



### 6.8.13 View 'key' images in current study



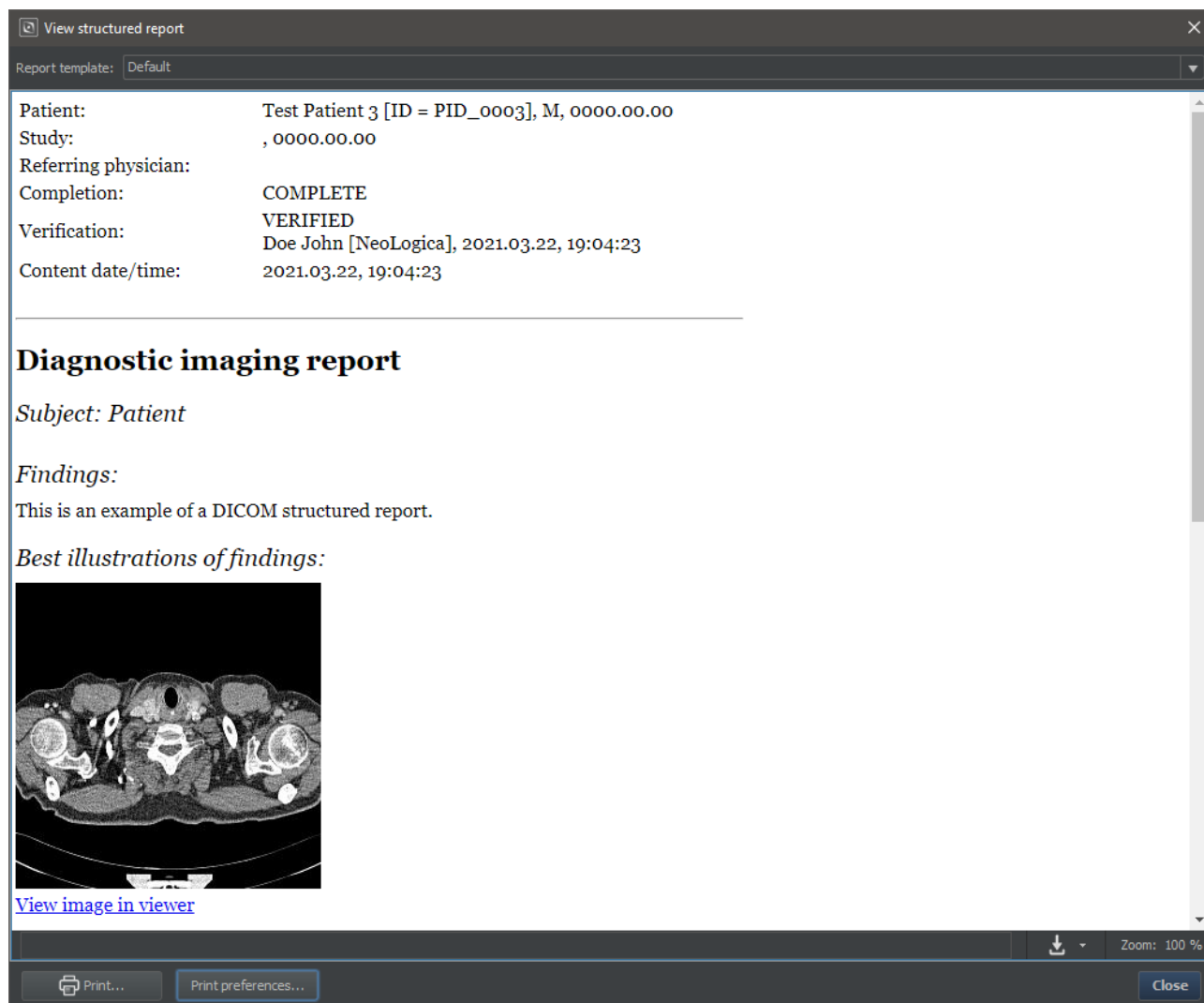
Pressing the *View 'key' images in current study* toolbar button (  ) all images previously marked as “Key Images” will be displayed in the current study panel, each key image in a dedicated image panel.

## 6.9 Viewing reports

LocalEye Viewer allows viewing reports associated with the displayed studies. The *View report...* toolbar button is shown in the following picture:



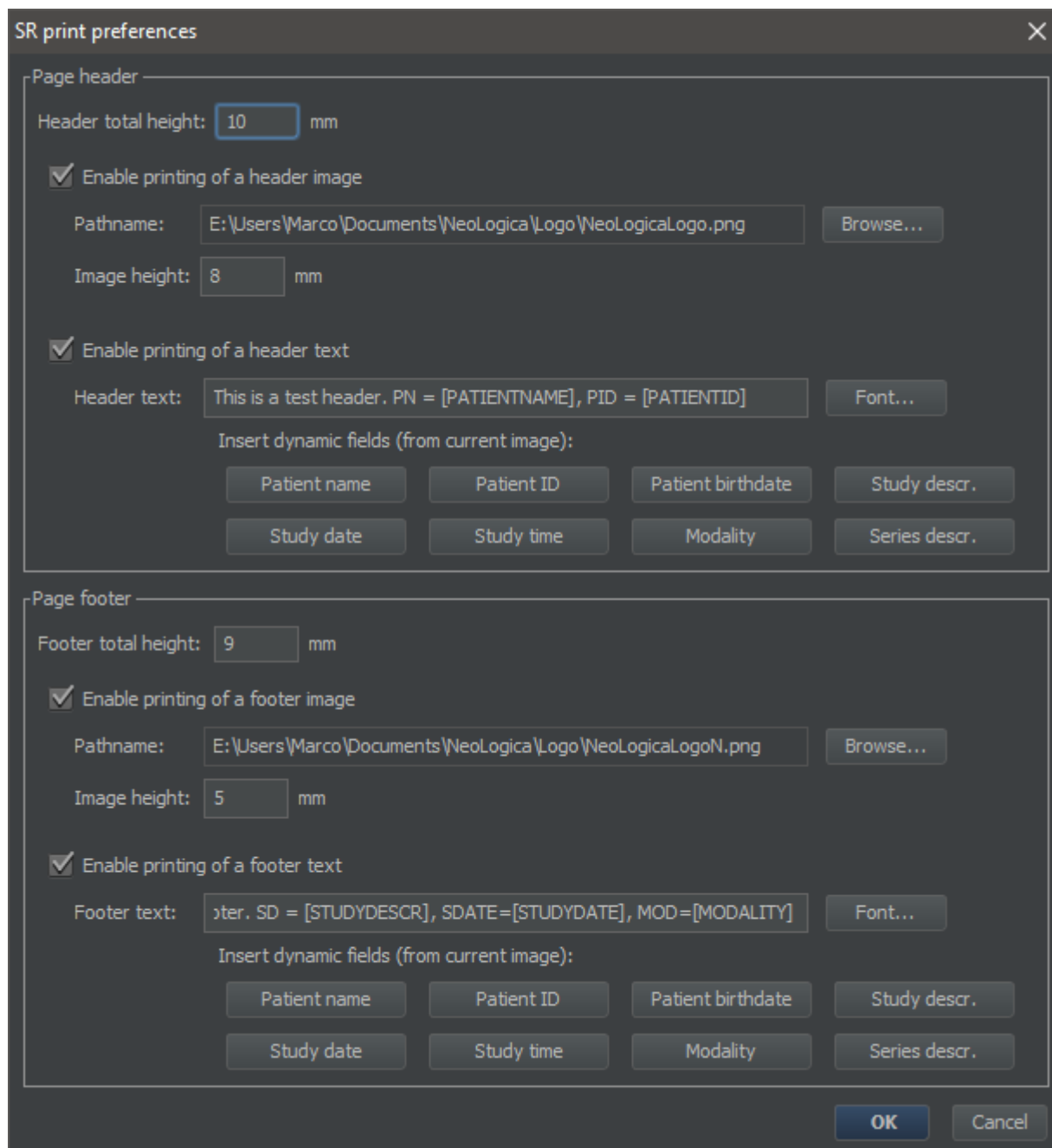
When this button is pressed, the report dialog-box will be shown and it will be possible to view the existing report for the current study (i.e., the study of the currently-selected image).



Depending on the viewer's configuration, one or more *Report templates* may be available. Selecting a given report template will affect the way the DICOM structured report is presented to screen and printed to an output sheet (which information is included in the report, how the text will look like, how each data is laid out to screen / sheet, etc.).

In case multiple DICOM structured reports are available, a selection window will appear, allowing to choose the desired SR. The displayed DICOM structured report may also be printed, through the *Print...* button.

By pressing the *Print preferences...* button, the *SR print preferences* dialog box (in case of DICOM structured report) will be shown, allowing to define a custom header and footer for the printed structured report, including both images and texts:



The **SR print preferences** dialog box is divided into two main sections: **Page header** and **Page footer**.

**Page header section:**

- Header total height:** 10 mm
- ☒ **Enable printing of a header image**
  - Pathname:** E:\Users\Marco\Documents\NeoLogica\Logo\NeoLogicaLogo.png (with a **Browse...** button)
  - Image height:** 8 mm
- ☒ **Enable printing of a header text**
  - Header text:** This is a test header. PN = [PATIENTNAME], PID = [PATIENTID] (with a **Font...** button)
  - Insert dynamic fields (from current image):**
    - Patient name
    - Patient ID
    - Patient birthdate
    - Study descr.
    - Study date
    - Study time
    - Modality
    - Series descr.

**Page footer section:**

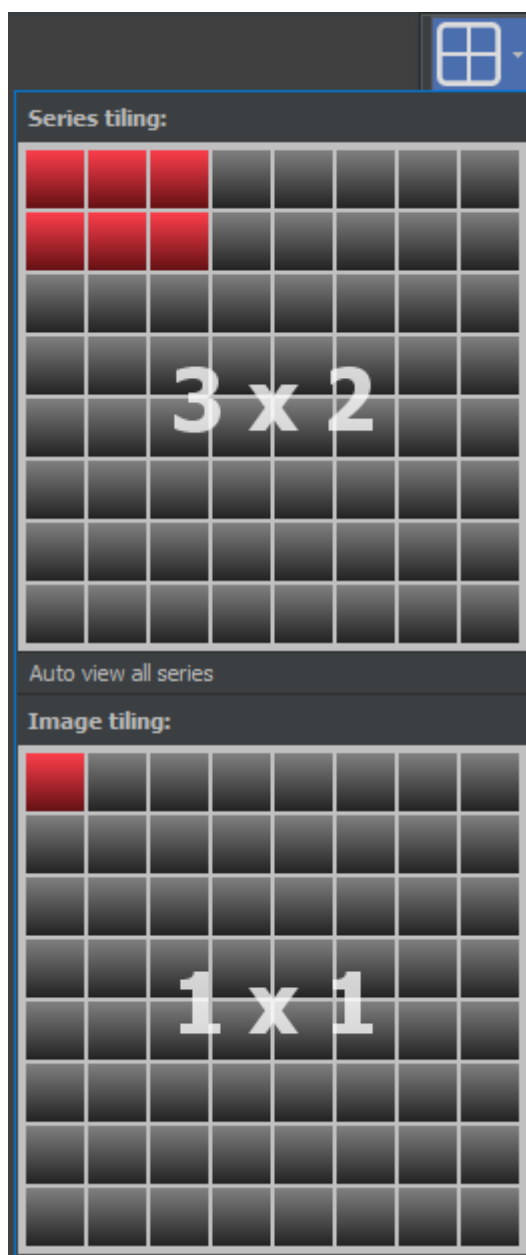
- Footer total height:** 9 mm
- ☒ **Enable printing of a footer image**
  - Pathname:** E:\Users\Marco\Documents\NeoLogica\Logo\NeoLogicaLogoN.png (with a **Browse...** button)
  - Image height:** 5 mm
- ☒ **Enable printing of a footer text**
  - Footer text:** ter. SD = [STUDYDESCR], SDATE=[STUDYDATE], MOD=[MODALITY] (with a **Font...** button)
  - Insert dynamic fields (from current image):**
    - Patient name
    - Patient ID
    - Patient birthdate
    - Study descr.
    - Study date
    - Study time
    - Modality
    - Series descr.

At the bottom right, there are **OK** and **Cancel** buttons.

## 6.10 Customizing series and image layout



Pressing the *Set display mode...* toolbar button (  ) is pressed, the following drop-down menu will appear:




This section allows defining exactly how series and images are presented within this study panel.

*Series Tiling* allows specifying the series tiling for the current study. The series tiling determines how many series will be concurrently visible, and their layout on screen.

If *Auto view all series* item is chosen, then all series are automatically shown and an auto-selected layout will be applied.


*Image tiling* allows specifying the image tiling for the series panel. The image tiling determines how many images of each series will be concurrently visible, and the layout of images inside the series panel.




If the *View study in full-screen mode* toolbar button (  ) is pressed, the selected study is viewed in full screen. You can exit from the full-screen mode by pressing the *ESC* button on the keyboard: normal-screen mode will then be restored.

## 6.11 Managing synchronized scrolling of series




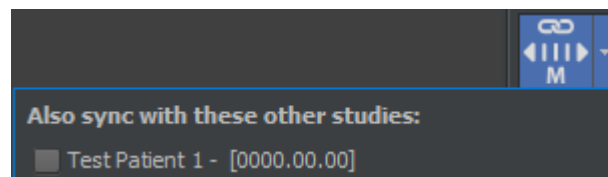
The *Toggle automatic series synchronization...* toolbar button (  ) allows synchronizing different CT or MR series whose images (slices) were acquired moving in the same direction (acquisition planes with the same orientation). The synchronization causes a scrolling through the images of these series, in such a way all panels show images related to the same patient coordinates (where available). The reference coordinates, at which all other panels are synchronized, are the ones of the currently selected image panel / series. In order to support synchronization of all series, the image tiling of all series panels is automatically set to 1x1. Once the *Toggle automatic series synchronization...* function is enabled, all scrolling operations will be synchronized across the displayed series. In order to disable the *Toggle automatic series synchronization...* function and the related locked scrolling among series, it is sufficient to click once again on the same toolbar button.



The *Toggle manual series synchronization...* toolbar button (  ) allows manually synchronizing different CT or MR series whose images (slices) were acquired moving in the same direction (acquisition planes with the same orientation). This manual function is useful when it is necessary to manually set the initial "aligned" state among several different series, and/or to synchronize scrolling among series belonging to different studies, even acquired by different modalities: under these conditions, the *Toggle automatic series synchronization...* function won't work. In order to use the manual series synchronization, the user must scroll all relevant series in such a way they all show images related to the same patient coordinates. When synchronized scrolling among several studies is necessary, the user shall select a given study, then click on the arrow-shaped drop down button, placed next to the *Toggle manual series synchronization...*



toolbar button (  ). A drop-down menu will appear, allowing user to choose the other studies (in addition to the current one) to synchronize with.



In case of cross-study manual synchronized scrolling, before activating the synchronization, the user must scroll all relevant series of each study, in such a way they all show images related to the same patient coordinates.


Once all relevant series have been scrolled in such a way to represent an initial "aligned" situation, it is possible to press the *Toggle manual series synchronization...* button in order to lock scrolling of all those series in a synchronized way. The scrolling position of each series in the moment when the *Toggle manual series synchronization...* button is pressed is considered to be the initial reference point. In order to disable the *Toggle manual series synchronization...* function and the related locked scrolling among series, it is sufficient to click once again on the same toolbar button.



**Warning:** synchronized scrolling functionalities are based on a software algorithm. As such, the proper functioning of sync scrolling depends on the correctness of several orientation and spacing data stored in the original DICOM datasets, in addition to the correctness of the implemented scrolling algorithm. The viewer itself has no mean to ensure these input data are correct. Hence, the proper synchronization of the series shall be checked in a very "critical" way by the user/radiologist, and any conclusion coming from these functionalities shall be carefully evaluated.

## 6.12 Sharing a study with a remote recipient



The *Share study through Dropbox* () toolbar button allows sharing the current DICOM study with a remote recipient (e.g., for a consultation, second opinion, etc.) by exploiting the sending user's Dropbox and a NeoLogica-powered cloud viewing infrastructure. This cloud-based viewing infrastructure has been called "Exams Sharing Portal (ESP)".

Clicking on this button, a step-by-step Share through Dropbox wizard is started, as shown in the following picture:

Share study through Dropbox

Share study through Dropbox: how it works

Thanks to this feature, sharing the images of a study with a remote recipient (e.g., for a consultation, second opinion, etc.) is **fast, easy and secure**.  
The basic concept is: **you** provide the **storage** (i.e., your Dropbox), **we** provide the cloud-based **viewing infrastructure** (i.e., our Exams Sharing Portal, or ESP).  
Press the **Know more** button on the right for details about the **pricing** and architecture of this service.

ESP account

Currently you are not logged in to the Exams Sharing Portal (ESP).  
Please choose how to proceed.

☒ I already have a user account on the Exams Sharing Portal (ESP): I will login now

☐ I don't have a user account on the Exams Sharing Portal (ESP) yet: I will create it now

ESP user account data

Your email:  X

Password:  X I forgot my password

Press **Next** in order to login to the ESP using the above account data.

How it works Finish Cancel < Previous Next >

The first step of this wizard allows user to authenticate on the Exams Sharing Portal by entering email and password related to his ESP account. If the user does not have a user account on the ESP yet, he can create a new one selecting the appropriate option, as shown in the following screenshot:

☐ I already have a user account on the Exams Sharing Portal (ESP): I will login now

☒ I don't have a user account on the Exams Sharing Portal (ESP) yet: I will create it now

ESP user account data

Your email:  X

Password:  X

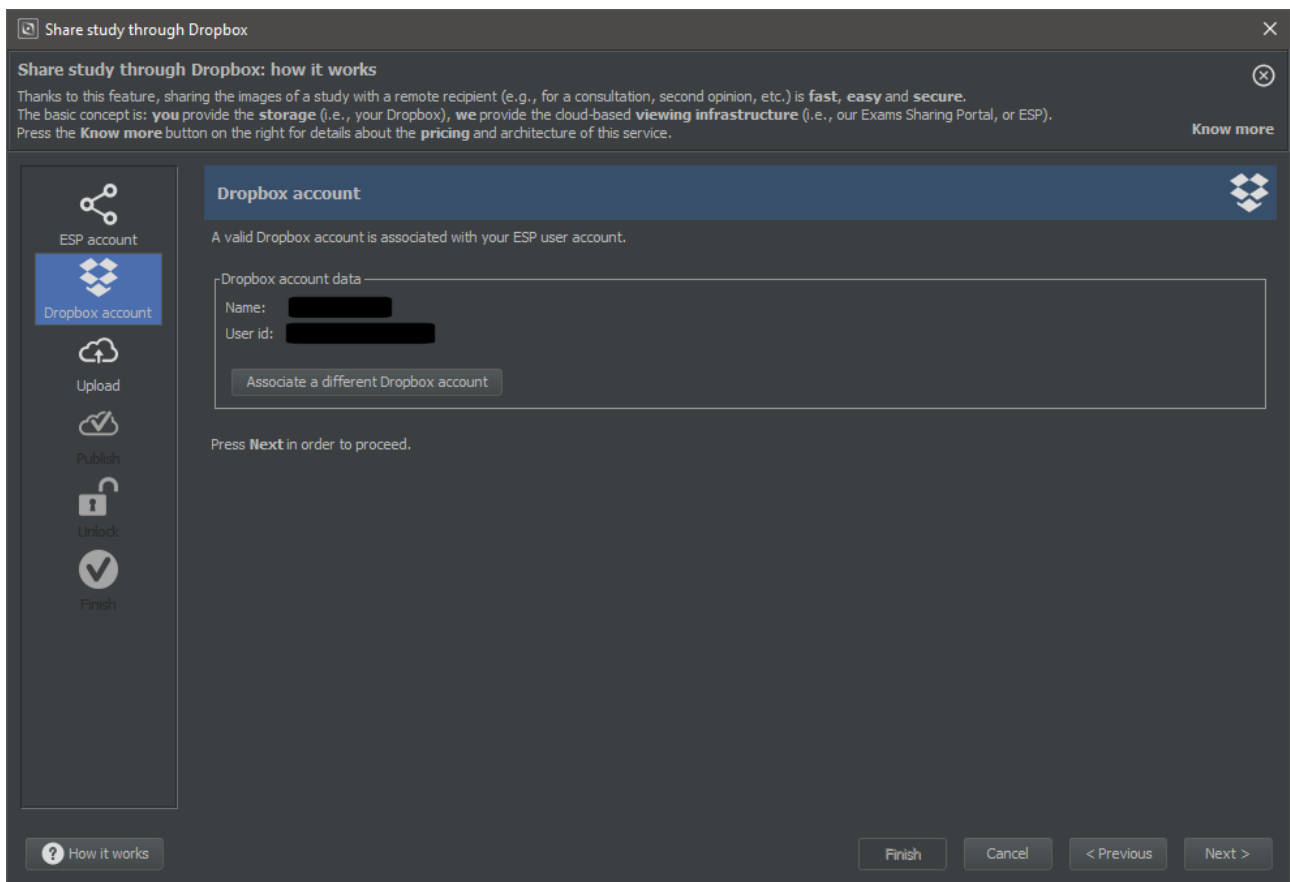
Password shall be at least eight (8) characters long.  
This password, together with the email address entered above, will be used to login to the Exams Sharing Portal.

Password (repeat):  X

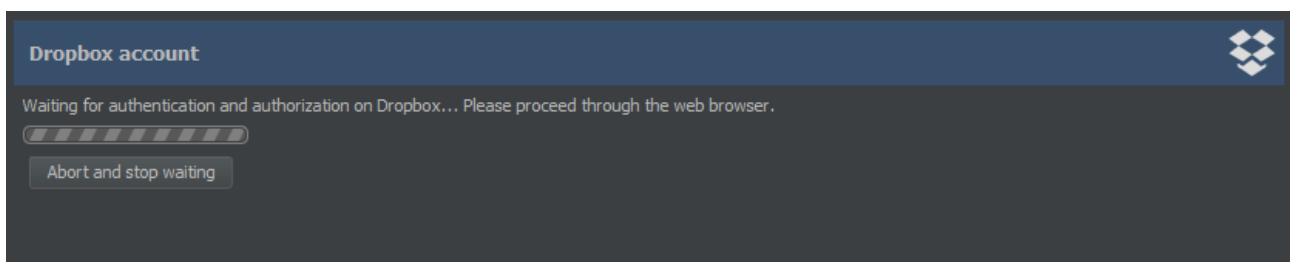
Press **Next** in order to create a user account on the ESP using the above account data.



Once user has successfully logged in to the ESP, LocalEye Viewer stores his login data, so that he will be able to auto-login upon later usages of the *Share through Dropbox* functionality.

Clicking on the *Next* button, the page related to the second step of the wizard will appear:



Once user has authenticated on ESP, an attempt will be made to authenticate on Dropbox. If automatic authentication succeeds, user can choose to proceed with that Dropbox account, as shown in the image above. Otherwise, if automatic authentication on the user's Dropbox is impossible or fails, or user just wants to associate a different Dropbox account, an authentication and authorization step takes place on Dropbox, as you can see in the images below:





Sign in to Dropbox to link to RemotEye Suite

Email

Password

[Forgotten your password?](#) [Sign in](#)

---

[New to Dropbox? Create an account](#)

Once user has logged in to the ESP, and access to user's Dropbox is granted, LocalEye Viewer is ready to upload current study's DICOM files to Dropbox.

Share study through Dropbox

Share study through Dropbox: how it works

Thanks to this feature, sharing the images of a study with a remote recipient (e.g., for a consultation, second opinion, etc.) is **fast, easy and secure**. The basic concept is: **you** provide the **storage** (i.e., your Dropbox), **we** provide the cloud-based **viewing infrastructure** (i.e., our Exams Sharing Portal, or ESP). Press the **Know more** button on the right for details about the **pricing** and architecture of this service.

ESP account

Dropbox account

Upload

Publish

Unlock

Finish

Upload

Your medical image files will now be uploaded to your Dropbox, in an encrypted way. Only the recipient of this sharing operation will be able to decrypt and view the uploaded images through the Exams Sharing Portal (ESP), once he knows the exam password.

Exam password:

Password shall be at least eight (8) characters long. All medical image files uploaded to your Dropbox will be encrypted through this password. You will need to communicate this password to the recipient of this shared study, in order to allow him to decrypt and view the medical images.

Exam password (repeat):

☐ Anonymize DICOM files before uploading to Dropbox

Select this option if you want to add a further layer of privacy to the data that you are going to share. Please notice that **only the attributes inside the DICOM header will be anonymized**, according to current anonymization preferences. Eventual personal identifying information burnt into the image pixels will be left unchanged. Also, please notice that in this case anonymous information will be published to the Exams Sharing Portal (ESP), hence the recipient will see anonymous data.

Anonymization preferences...

How it works

Finish

Cancel

< Previous

Next >

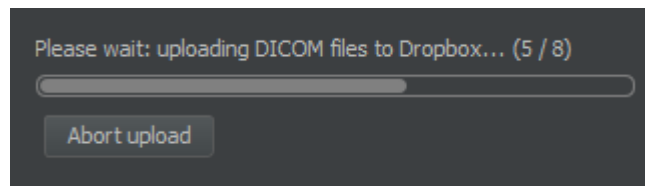
In this step, user is prompted to choose a password needed to encrypt all DICOM files which will be uploaded to his Dropbox. This password must be at least 8 characters long, and user will need to communicate it to the recipient of the shared study. Through this password, indeed, the recipient will be able to decrypt and view the medical images.

In addition, selecting the option *Anonymize DICOM files before uploading to Dropbox*, a further layer of privacy will be added to the data that user is going to share.



**Important note:** please consider that only the attributes inside the DICOM header will be anonymized, according to the anonymization preferences. Eventual personal identifying information burnt into the image pixels will be left unchanged. Also, please notice that in this case anonymous information will be published to the Exams Sharing Portal (ESP), hence the recipient will see anonymous data.

At this point, LocalEye Viewer is ready to encrypt and upload all DICOM files related to the current study to user's Dropbox. During the upload of DICOM files to Dropbox, a progress bar shows the current progress of the whole upload procedure, which may be very lengthy. User can choose to abort and stop the upload operation.



Once the upload to Dropbox of all DICOM files of the study has successfully completed, the "Publish to Exam Sharing Portal" step takes place:

**Share study through Dropbox**

**Share study through Dropbox: how it works**

Thanks to this feature, sharing the images of a study with a remote recipient (e.g., for a consultation, second opinion, etc.) is **fast, easy and secure**. The basic concept is: **you** provide the **storage** (i.e., your Dropbox), **we** provide the cloud-based **viewing infrastructure** (i.e., our Exams Sharing Portal, or ESP). Press the **Know more** button on the right for details about the **pricing** and architecture of this service.

**Publish**

The just-uploaded exam will now be published to the Exams Sharing Portal, in such a way it will be available to the recipient for viewing. The recipient will receive an appropriate link, as well as appropriate login information, which will enable him to access the exam's images.

Please enter recipient's email address:

☐ Transmit exam password to recipient by email

WARNING: transmitting the exam password to the recipient by email may be insecure. If you want to ensure maximum security, please leave this option unselected, and transmit the password to the recipient through a different mean (e.g., phone call).

Note for the recipient of this shared exam (optional):

**How it works** **Finish** **Cancel** **< Previous** **Next >**

Here, it is necessary to enter the email address of the recipient, which will be used to send him a notification email, informing him about the availability of a shared study for him on the ESP. This email will provide the recipient with an appropriate link, as well as login information, which will enable him to access the exam's images. Also, this email address will be used to create the recipient's user account on ESP, if not already existing. It is possible to send the exam password to the recipient directly by email, by selecting the *Transmit exam password to recipient by email* option.

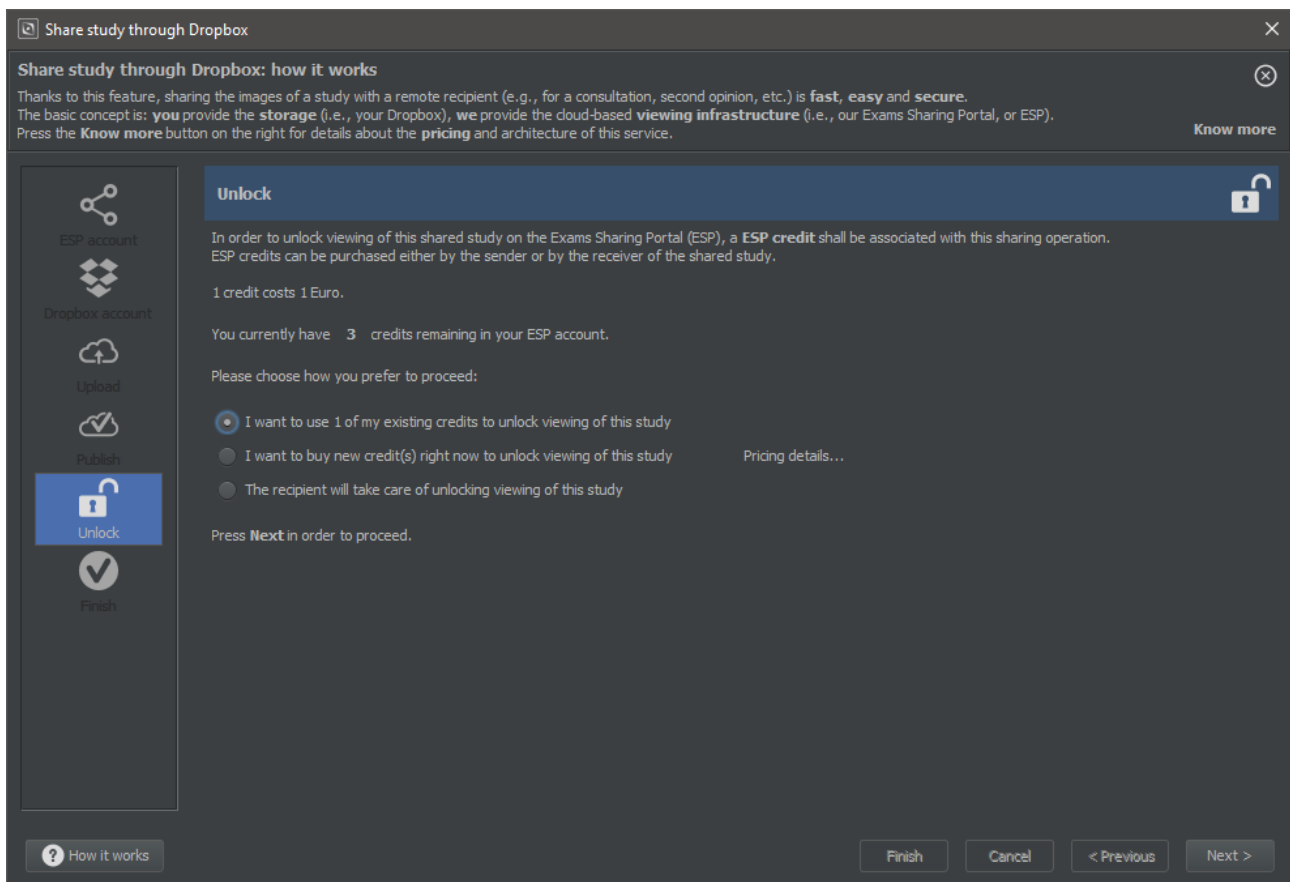


**Warning:** transmitting the exam password to the recipient by email may be insecure. If you want to ensure maximum security, please leave this option unselected, and transmit the password to the recipient through a different mean (e.g., phone call).

Finally, user can type a note for the recipient of the shared exam through the appropriate box.

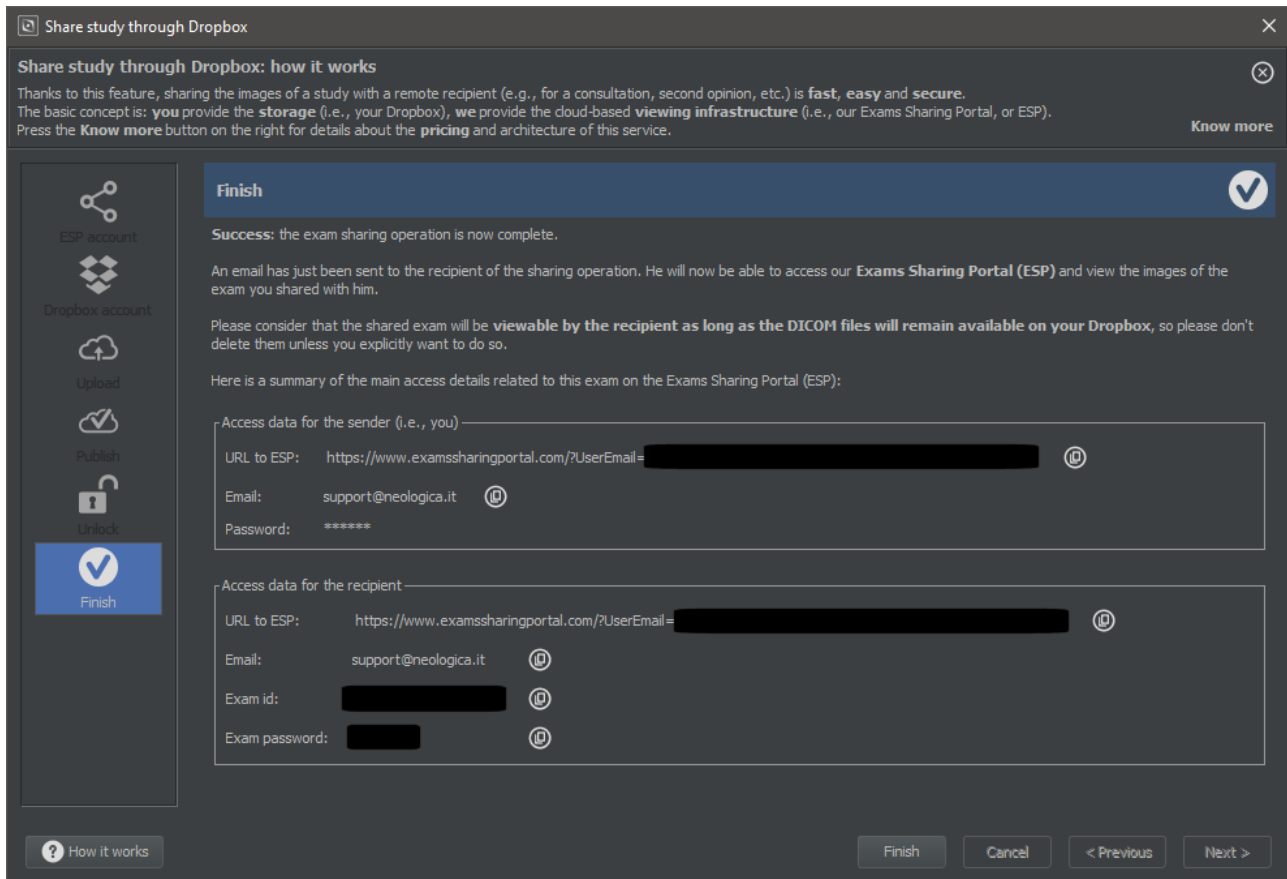
At this point, clicking on the *Next* button LocalEye Viewer will publish the current study to the Exams Sharing Portal (ESP).

Once the study has been successfully published to ESP, user can choose whether to use one of his existing credits (if available) to unlock viewing of the study, or to purchase new credits to unlock the study on behalf of the recipient, or rather to leave the recipient the task of unlocking the study at a later stage.





Once a user has unlocked a shared exam, that exam will be online and viewable (by both the sender and the recipient) as long as the sender will keep it in his own Dropbox, for an unlimited number of times.

Once the unlock step has been done or skipped, the exam sharing operation is complete, and LocalEye Viewer provides a final summary:

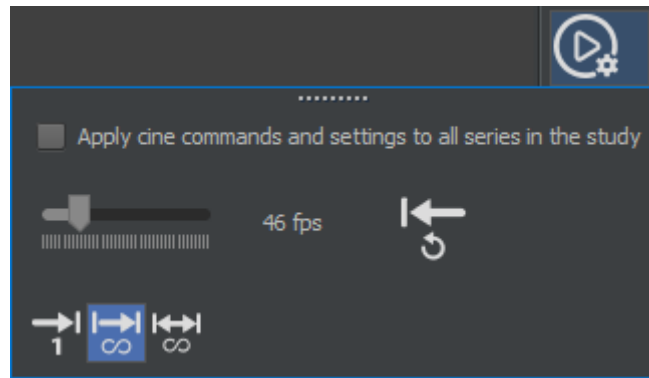


### 6.13 Cine playback of dynamic sequences

Cine movie toolbar buttons allow obtaining a dynamic playback of the cine sequences belonging to the current study.


The *Play/Stop cine movie* toolbar button (toggling between  and ) allows you to start or stop the cine-playback of cine-sequences currently displayed within the current study panel.

Pressing the *Playback preferences...* toolbar button () , the following options panel will appear:





The *Apply cine commands and settings to all series in the study* option let you decide whether the play and stop commands will have effect just on the currently-selected cine sequence, or rather to all series within the study.


It's possible to modify the speed of the playback (in terms of frames per second, or FPS) by dragging the

dedicated slider. The *Apply default FPS (movie speed)* button (  ) allows setting the predefined playback speed for a given cine-sequence (according to the information coming from the DICOM dataset, if available).

The buttons on the bottom of this cine preferences panel allow controlling the loop mode of the playback, which can be *Play once*, *Looping* (default) or *Sweeping* (i.e., back and forth).

Pressing the *Play once* button (  ) the frames 1 to N (where N is the total number of frames in the current series) are displayed in rapid sequence, then the playback is stopped.

Pressing the *Looping* button (  ) the frames 1 to N are displayed in rapid sequence, then the playback begins again from frame 1 and so on (frame sequence: 1,2,...,N,1,2,...,N,1,2,...).



Pressing the *Sweeping* button (  ) the playback sequence is as follows: 1,2,...,N,N-1,N-2,...,2,1,2,...,N... (forward and backward).

## 6.14 Navigating among available series

The following toolbar buttons allow you to navigate among the available series:

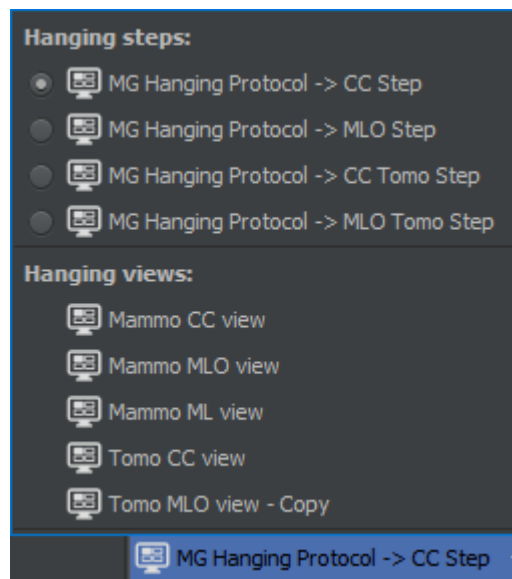





The *Previous series* toolbar button (  ) and *Next series* toolbar button (  ) are used switch the currently-selected series panel to the next or previous series (if multiple series are available in the current study).

## 7 Hanging steps and study view presets

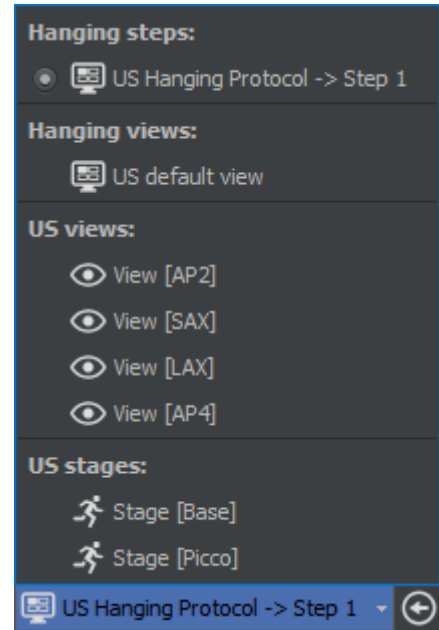
The picture below shows the "*Hanging steps* / Hanging views" dropdown box, which is located at the bottom-right corner of the viewer's window(s):



In case "*hanging steps*" are defined within a hanging protocol, it will be possible for the user to easily iterate through all "hanging steps" which are present within the hanging protocol, also in a next/previous fashion, through the arrow buttons available next to this dropdown box (  ). Switching to a different hanging step is a viewer-wide operation, which may have an effect on what is hung on all available monitors. It is possible to open several studies, belonging to different modalities or even different patients, and to hang them all together according to their hanging steps.

Each individual hanging view defined in the matching hanging protocol(s) can be directly applied to the single study panel through the same dropdown box.

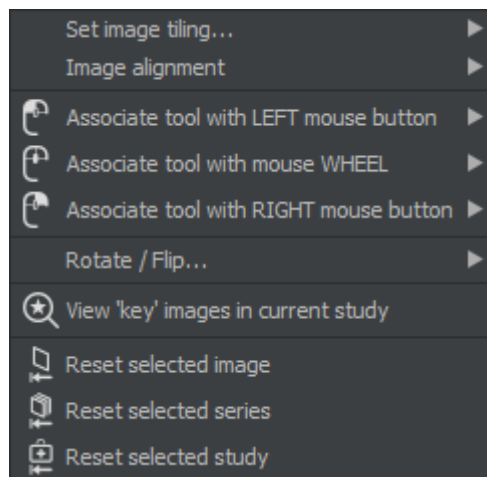
For some particular kinds of studies, special hanging functions are available in the view presets drop-down menu. For instance, in case of ultrasound "echo stress" studies, user will be able to select hanging of series "by view" or "by stage". When selecting a given "view" from the drop-down menu, LocalEye Viewer will display all series related to that view, and will arrange the series tiling automatically in order to contain all series related to that view. In the same way, selecting a given "stage" from the drop-down menu, LocalEye Viewer will display all series related to that stage, and will arrange the series tiling automatically in order to contain all series related to that stage.



## 8 On-image popup menu

LocalEye Viewer features a pop-up menu on images, which allows a fast selection of common tools, functionalities and options.

In order to show the pop-up menu it is necessary to right-click on a non-empty image panel while keeping the *Ctrl* key of the keyboard pressed. Since LocalEye Viewer allows a flexible association of image tools to both left and right mouse buttons, pressing *Ctrl* on the keyboard is necessary, in addition to right-clicking, to display this pop-up menu.



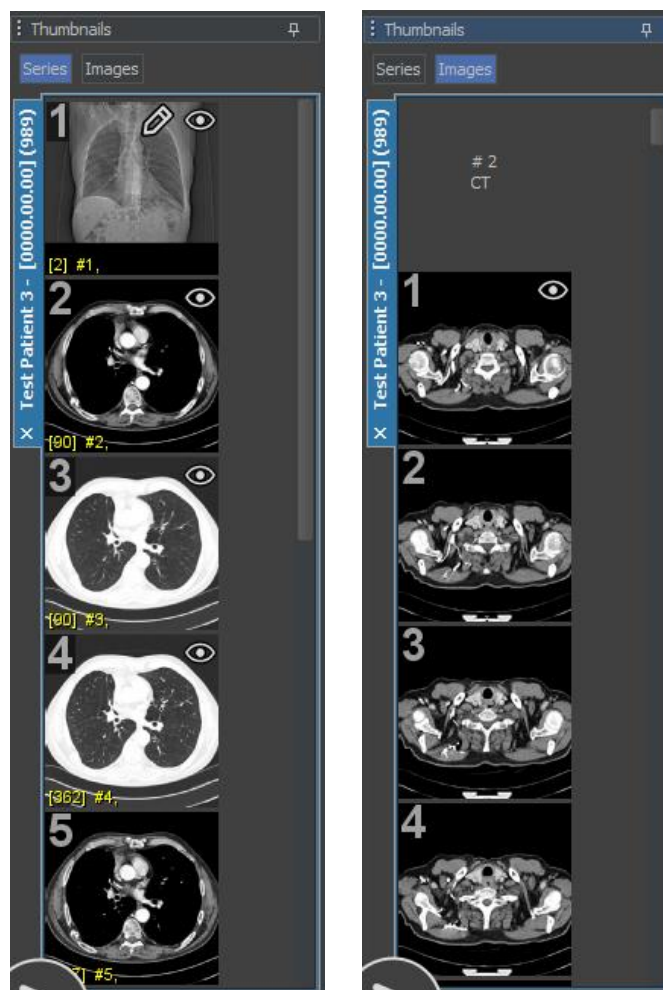
LocalEye Viewer also supports a faster association of the tools with the left, right and wheel mouse buttons. In order to change the tool associated with the left mouse button, press the left mouse button while keeping the *Shift* key pressed on the keyboard. In order to change the tool associated with the right mouse button,

press the right mouse button while keeping the *Shift* key pressed on the keyboard. Finally, in order to change the tool associated with the wheel mouse button, press the wheel mouse button while keeping the *Shift* key pressed on the keyboard.

The pop-up menus are particularly useful when operating in full-screen mode, since most functions may be accessed without the need for the main toolbars.

## 9 Thumbnails panel

The *Thumbnails* panel displays thumbnail images:





If the *Series* option button is selected on the *Thumbnails* panel, then each thumbnail image will represent a series currently loaded in LocalEye Viewer, and the number of displayed thumbnail images for each study will be equal to the number of series currently loaded in LocalEye Viewer for that specific study. The thumbnails are grouped by study.

On the other hand, if the *Images* option button is selected on the *Thumbnails* panel, then each thumbnail image will represent a single image currently loaded in LocalEye Viewer, and the number of displayed

thumbnail images for each study will be equal to the total number of images currently loaded in LocalEye Viewer for that specific study. Also in this case the thumbnails will be grouped by study and series.

Drag&drop of images or series from the *Thumbnails* panel to the study panel(s) is supported. You can also select multiple thumbnails in the *Thumbnails* panel, by the Windows-usual *Shift-click* or *Ctrl-click*, and then dragging & dropping all selected images or series (depending on the active mode) to the Study panel.

Double-clicking on a thumbnail will load the double-clicked series or image into the currently selected image panel. Double-clicking on a series thumbnail while pressing the *Alt* key on the keyboard will load the study panel with the scene starting at the double-clicked series. Double-clicking on the tab related to a particular study, will hang the study, following the rules of the first matching hanging protocol.

When the proper option is enabled in the *Settings* section (under *Display preferences*) , the thumbnails will be marked by symbols to identify the series or images displayed on the main study panel(s): while the  symbols identify the series or images currently displayed (i.e., hung on screen) in LocalEye Viewer, the  symbol indicates the currently-selected series.

The thumbnail panel may be hidden or shown by clicking on the pin icon appearing at the top right of the panel itself.

## 10 How to report issues

In case you encounter issues or you detect a malfunctioning while using the LocalEye Viewer software, please report the problem to the NeoLogica Support Staff.

NeoLogica uses a ticket-based online support system. In order to report a problem, please browse to the following web address:

<https://www.neologica.it/Support>

You will then be able to open a new "support ticket", and specify the details of the issue you have detected. The NeoLogica Support Staff will analyze the reported issue and will reply promptly, then making every effort to solve the issue in the shortest possible time.

## 11 Acknowledgments

LocalEye Viewer relies on the CharLS library in order to decode JPEG-LS-compressed images.