VET Eickemeyer®

MEDIZINTECHNIK FÜR TIERÄRZTE

DigiVet

Basic-Software

User Manual V 1.0

Warnings and used symbols

To ensure the safety of patients, staff and other persons, any changes to software and hardware delivered by Eickemeyer may only be made with prior written permission from Eickemeyer.
Please read the respective manuals of the connected devices, such as of the X-ray generator, sensor, or scanner, before starting to use the ***Eickemeyer DX-R*** software.
The following symbols will be used throughout this manual:

DANGER
The functionality of the software can be destroyed in the case of incorrect use. If unauthorized changes have been made to delivered software and hardware components, the warranty by Eickemeyer becomes void. Eickemeyer will not accept any responsibility or liability for the proper functioning of the product in such a case.

CAUTION
The functionality of the software can be limited in the case of incorrect use.
Hints that require special attention.

NOTE
Notes represent information that is important to know but which do not affect the functionality of the software.

PRACTICAL HINT
A hint on how the work flow could be made easier within the software.

Inhalt

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2 Introduction

Thank you very much ***for deciding on Eickemeyer DX-R - our X-ray Acquisition Software for flat panels and CR systems.***
This user manual provides detailed information about the operation of Eickemeyer DX-R and the use of the range of facilities included in the software to make the processing and administration of your medical X-ray images as efficient as possible.
Quality Management

The product development process is subject to a quality management system in accordance with DIN EN ISO 13485:2003.

Safety Instruction

To ensure the safety of patients, staff and other persons, any changes to software and hardware delivered by OR Technology may only be made with prior written permission from OR Technology.

Liability

If unauthorised changes have been made to delivered software and hardware components, the warranty by OR Technology becomes void. Eickemeyer will not accept any responsibility or liability for the proper functioning of the product in such a case.

Eickemeyer KG, Germany

3 System requirements

3.1 Hardware

Processor	Intel core duo/ core 2 duo or comparable with AMD dual core processor
RAM	Min. 2 GByte RAM
Harddisk	minimum 80 GByte for software and for the archive
	two partitions, drive C:\ (for windows and dxr software) and drive D:\ (for acquired data, min. capacity of 25 GByte) is preconditioned
Network	min 100 MBit
Graphicard/Monitor:	Resolution of minimum 1280x1024 pixel using the true-color mode
	Windows XP
Flat-Panels	Please note the requirements for the different flat panels and generators e.g. additional network

3.2 Monitors

If a ***diagnostic monitor*** is used, it should satisfy the following requirements:

1. DVI connection (no VGA)
2. Resolution of at least 1,280 x 1,024 pixels
3. Special b/w monitors from 18,1“ TFT with high luminance
4. High fidelity of grey tones and optimal luminance distribution
5. Preset DICOM LUT

A ***viewing monitor*** should satisfy the following requirements:

1. VGA and/ or DVI connection
2. Resolution of at least 1,280 x 1,024 pixels
3. TFT-Colour from 17” with high contrast ratio (450:1)
4. High fidelity of grey tones and good luminance distribution
5. Preset DICOM LUT

For diagnostic and viewing workstations the use of b/w monitors, which satisfy the requirements of image display devices for medical use, are recommend. **All monitors** must **conform to the requirements of the IEC 61223-2-5:1994** and **pass the acceptance and display check**.

The size of the screen depends on the application. An accurate table for selecting the correct monitor dimensions can be found in the quality assurance guidelines of the German Medical Association.

3.3 Installation of Eickemeyer DX-R

Please run the included setup “Eickemeyer_DX_R_setup_EN.exe”. The setup creates a version of the ***Eickemeyer DX-R*** software on the drive C:\ of your PC.
After installation, ***Eickemeyer DX-R*** icon will be displayed on the desktop. By double clicking on the icon the **Eickemeyer *DX-R*** software starts. If the software starts in the demo mode a information displays that the program uses a temporary license. Please confirm this information by clicking on “OK”. The demo license is only available for 20 days.

4 Purpose and important information

Eickemeyer DX-R is not approved for the acquisition of mammographic image data.

Lossy compressed mammographic images and digitized film screen images must not be reviewed for primary image interpretations. Mammographic images may only be interpreted using an FDA approved monitor that offers at least 5 MP resolution and meets other technical specifications reviewed and accepted by FDA.

Eickemeyer DX-R is meant to be used by qualified medical personnel only. All users must be qualified to create and diagnose radiological image data.

The ***Eickemeyer DX-R*** software is an independent product for the acquisition, processing and optimisation of X-ray images (raw images) provided by flat panel (DR) systems or CR systems. In principle, the brand of the particular DR or CR device makes no difference. The open architecture allows integration independent of the producer.

In general, such software is also called “console software” as it is installed on the so-called “console PC” of the imaging device. ***Eickemeyer DX-R*** carries out the image processing of the raw images provided by the particular device and provides the radiographer / X-ray assistant with an optimum workflow for his work.

The large range of functions includes a professional image viewer and a detailed multimedia radiographic positioning guide to support the correct preparation of exposures. During development, strong emphasis was placed on a smooth workflow to simplify and shorten procedures and to eliminate potential sources of error.

The X-ray images provided by ***Eickemeyer DX-R*** are stored in a database and made available to picture archiving and communication systems (PACS). The option of communication with patient management systems (HIS, RIS etc.) to exchange patient data is also integrated.

In short, ***Eickemeyer DX-R*** is comprehensive, independent software for the complete integration of DR/CR systems, X-ray generators, image processing and patient management systems. It enables the simple and fast creation of professional X-ray images and further processing of these images in both human and veterinary medicine.

Operating System

The operating system for **Eickemeyer DX-R** should be normally a Windows XP professional. In some cases Windows 7 may already be used. Whereas **Eickemeyer DX-R** itselfs works on windows 7 without restrictions, there can be restriction concerning the flat panel. A minimum of 2 GB RAM are necessary to ensure a smooth workflow.

Measuring

In addition to acquiring and displaying images the application also allows them to be measured.

CAUTION
Measurements can be taken of lines (in millimetre) and angles (in °, degrees).The **length of a line** can only be **given in millimetres if** the **DICOM image contains**the **reference scale of pixels** to the resulting length.

Compatibility

The compatibility of hard- and software is ensured by defining hard- and software characteristics when processing of orders. During installation this will be finally checked.

Monitor quality

The examination of medical X-ray images may only be done on approved diagnostic monitors by means of ***Eickemeyer DX-R***. The relevant certification is done according to IEC 61223-2-5:1994.

CAUTION
In order to test the consistency of these parameters during operation, monitor consistency tests must be performed at regular intervals. The regularity of these tests is laid down in the acceptance protocol. In general a daily visual check must be performed every day, this check is described on page 64. In particular the 5% and 95% greyscale areas must be clearly discernible.

Image Resolution

Images with a high resolution have to be scaled down to display the whole image on screen (adjustment to screen size). After this adjustment, not all of the image information available is displayed on the screen. Please use monitors with the required high resolution and the 100% display function of ***Eickemeyer DX-R*** viewer.

5 Working with Eickemeyer DX-R

First of all start the Eickemeyer DX-R application by a double click to the icon „Eickemeyer DX-R“, which is located on the desktop, or by using the „start menu -> programs -> dicomPACS -> dicomPACS DX-R“. If the demo mode of the software starts, an information displays, that the program uses a temporary license. Please confirm this message by clicking on “OK”.

5.1 Program start and log-in

Once the program has been started the user will be asked to log in. Depending on the login level it can be called up the program components “support mode” and/or “configuration”. The support mode is only for users having admin rights.

The software ***Eickemeyer DX-R*** is divided into different screens which are passed through successively. The first screen is the „patient“ view, the second is the „x-ray“ view and the last screen which belongs to the workflow is the „lists“ view. A further screen is the „management“ screen.

NOTE
The demo version does not require a special login for ordinary working with the software, not using the technician mode and the configuration mode. Please just confirm the boxes “user name” and “password” by pressing the ENTER key.

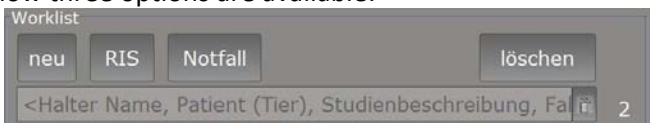
The entire interface is designed for touch screen operation, with the exception of special measuring functions. In this case the data can be captured with a so-called "virtual keyboard". The keyboard appears after activating an input field and is adapted to the different kinds of input fields.

5.2 Screen „patient“

After log-in to the Eickemeyer DX-R the program starts with the patient screen immediately. This is where patient data and X-ray jobs are recorded. On the left hand side of the screen, all data of a patient is displayed or entered. The right hand part of the screen shows the worklist. If the system has been newly installed or if all patients have been dealt with, this list will be empty.

When using a touch screen, the patient data will be captured via the "virtual keyboard". The keyboard appears after activating an input field.

For starting a patient workflow three options are available:



5.2.1 Create a new patient

A click on the „new“ button allows to enter data of a new patient in the boxes on the left hand side of the screen. The input fields marked in red are compulsory fields. The buttons “F” and “M” denote the gender.

5.2.2 Querying a dicom worklist

After having clicked the “RIS” button, a DICOM worklist is queried and the results entered into the list. The worklist has to be configured beforehand. Alterations or additions may be made at any time by clicking on the data fields on the left hand side of the screen.

5.2.3 Create an emergency

If it is necessary to interrupt an examination which has been already started, for instance due to an emergency, it can always do so. Simply switch to the “patient” screen and press the „emergency“ button. This function is useful if there is no data available on a patient or an examination must be carried out very quickly. After clicking on “emergency” the system automatically creates a new patient called “emergency”. The patient ID will consist of the date and the time of the record (#-<timestamp>) so that the correct patient data can be entered at a later stage

5.2.4 Delete a patient

This button allows to delete a selected patient from the worklist.

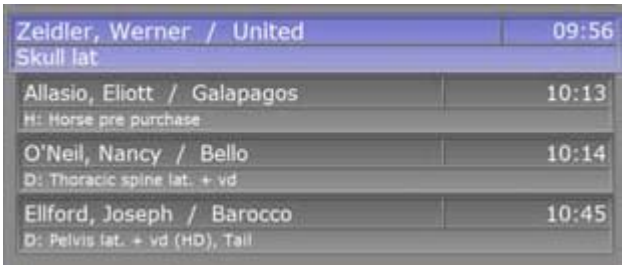
NOTE
The option „delete“ is only available if there are no exposures or planned examinations according to this patient. Otherwise the button will be hidden by the system.

5.2.5 Search for a patient or examination

Furthermore a special search bar above the patient entries is available. Using this bar it is possible to search for data across several fields. The software always searches „surname“ and „study description“ simultaneously. Red marked patient inside the worklist are interrupted patients.

WORKLIST ENTRIES

Each worklist entry has a status and in accordiance with the status the entry will be displayed in different colours.

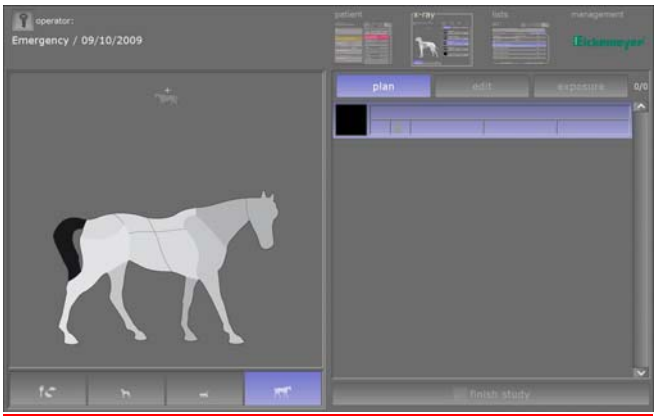


Interrupted worklist entries are displayed in red, are always at the top of the list and sorted by time. An interrupted worklist entry is a special feature where exposures have been planned or taken, but further processing has not taken place. It can be necessary to interrupt a patient if a sequence of examinations requires repeated breaks, or if an examination has to be interrupted to deal with an emergency. New worklist entries, without any planned examination, are displayed in grey and blue and located below the interrupted worklist entries. These entries are also sorted by time.

5.3 Screen „x-ray“

5.3.1 Planning

After selecting or creating a patient there are two options to switch to the „x-ray“ screen. First is to double click on the according patient. Second is by selecting the patient and click to the x-ray icon.



NOTE
The „macro“ icon is displayed on the upper edge of the illustration. Here several macros for recurring examination procedures can be configured. Such procedures may, for instance, screening examinations, organs in several planes or even display checks. Macros may also be stored directly in a body part, e.g. “skull”.

The screen shows the organ structure as the first illustration for the selection. The kind of the species is displayed below the organ structure. To change the species press the according button with the required species.

The organ structure is optically divided into different sections (body parts). By clicking on a body part, e.g. skull, all standard examinations of the selected body part will be shown. To add an examination to the job list a simple click to the required examination suffices and the planned examination appears to the job list on the right hand side.

5.3.2 Edit

If a false examination has been added to the job list, it is possible to delete this one, therefore change to the „edit“ tab and press the bin button of the corresponding examination.
Furthermore it is possible to exchange an examination (select a new examination on the left side) or to review done exposures (click through the preview image) by using the „edit“ tab.

5.3.3 Exposure

To get an exposure two kinds of image acquisition processes are possible..

Using flat panel (DR) systems or CR systems. The actual X-ray exposure is prepared by clicking on the button „exposure”. The generator panel is a optional component. All values can also be adjusted and sent by an existing x-ray generator console panel, therefore deactivate the panel.

The following screen is displayed for starting the scanning process for a CR system.

Using the integrated generator panel, all standard values and settings (KVp, mAs focus etc.) will be displayed as recommendations and could be changed by the „support mode“.

The generator panel is displayed for starting the acquiring processes of exposures. These values can now be adjusted if required and are passed on to the generator.

Beside the values for KVp and mAs it is possible to adjust the standard value through the weight of the patient or thickness of the body part. The according values of KVp and mAs will be adjusted automatically.
Furthermore the density point could also be adjusted. The according values of KVp and mAs are adjusted as well automatically.
The information about the pregnancy has to be configured using the generator panel. Different parameters are selectable.

Normally each sensor, which could be connected, calibrates automatically, if not the ***Eickemeyer®DX-R*** offers the possibility to calibrate the panel.
To start the sensor calibration press the „Calibration“ button.
All parameters should be configured and sent automatically to the generator. If all data were sent and verified and the flatpanel is ready and the status LED is green, the radiographer triggers the exposure at the actual X-ray system.
As soon as the X-ray image has been taken, it is optimized in accordance with the image processing algorithm stored for the examination and displayed immediately instead of the generator panel.
Beneath, some functions to review in detail or change the image are available.

These different tools are available inside the toolbar below the exposure:

Displays the X-ray pixel per pixel (full resolution)

Shows the complete image

„Zoom + “ Enlarges the image

„Zoom - “ Reduces the image

Turn right Rotates the image to the right by 90°

Turn left Rotates the image to the left by 90°

brightness + Increases the perceived brightness (gamma curve)

brightness - Reduces the perceived brightness (gamma curve

Black border To draw or adapt the black mask around the image

Reset Restores the original condition of the image

White point

This function allows to re-determine the region of interest (ROI) for the image processing filters if the X-ray image does not meet the expectations after it was taken. Click on this function and then simply place the special rectangular cursor on the lightest area of the bone structure. The currently used image region is then highlighted with a red frame and the X-ray image is automatically re-configured.

Quality assessment for images

The visual impression of the images can be evaluated as "good", "moderate", "poor" and "not rateable ". The quality assessment results are analyzed by a ***Eickemeyer®DX-R*** technician. If necessary the processing for certain exposures can be adapted.

5.3.3.2 Retake / Discard images

If an image does not meet the quality criteria because, for instance, the patient moved or because the collimation of the X-ray device was incorrect, this exposure can be rejected.

NOTE
The system automatically reverts to the exposure mode and indicates in the examination list that this image was rejected. It also indicates how many images of this examination were rejected.

5.3.3.3 Accept an image

By clicking on this symbol the currently visible image is accepted, sent to the configured DICOM recipient (e.g. PACS) and is thus used as the “original image” created by the system.

NOTE
Subsequently, this original image cannot be altered any longer. Of course this image can also be loaded into the viewer and re-processed. The changes then made in the viewer, however, do not apply to the original image, but are stored in addition to the image. If this image is then loaded again from the database, these stored changes are simply “applied” on the image.

5.3.3.4 Display Images in the Viewer

The ***Eickemeyer®DX-R*** software has an integrated professional viewer. This viewer provides extensive image processing options, such as inserting annotations, measurements, printouts, export and many other functions. The following chapter includes a detailed description of the viewer.

5.4 Screen „list“

The List screen displays all studies of all patients. Finished studies are displayed as well as not-finished studies.
This screen allows to search for studies using different criteria, load them into the viewing application, create a patient CD, conclude unfinished studies or to create a new study with the same patient data as well as to extend this finished patient.

PRACTICAL HINT
Once an examination has been highlighted, it can be switched immediately to the screens „patient“ and „X-ray”. Thus patient data and/or additional exposures for examination can be supplemented or altered. Additional images that have not yet been accepted can also be altered.

6 The Eickemeyer DX-R Viewer

The build-in viewing application will be opened by a click on the button which displays an eye.
The viewing application is divided into three different sections. On the left side the navigation bar is located and on the right side the tool bar is located. The main screen is the working area which is located in the middle of the application. To return to the console press the „back“ button inside the viewer

Tool bar
Most important tools can be activated just by clicking on the toolbar buttons. The function of a button is displayed as a short tool tip, if the mouse moves over the button.
Working area
All loaded images are displayed in the working area and are available for editing.
Navigation bar
Information bar All opened images are visible on the navigation bar, even when not displayed in the working area.
All important information such as patient data etc. are displayed.

6.2 The toolbar - general handling

The tool bar is divided into separate tool areas. Each tool area contains a number of tools belonging to a thematic group.

All settings can be adjusted by clicking on the symbol, with the two arrows, in the respective area. Tools whose buttons are not directly visible on the toolbar can still be used by clicking on the button in the configurator or by using a keyboard shortcut.

Depending on requirements and usage, the buttons visible in the toolbar areas can be hidden or shown (by ticking the box next to the button) or allocated to a keyboard shortcut. In order to enter the desired shortcut, position the cursor in the field next to the button and enter the shortcut via the keyboard (e.g. C or Alt+C).

A further important element of the toolbar is the overview area. It shows the displayed image in the working area as an overview.
A green frame in the overview area marks the part of the image currently visible in the working area. The visible area can be moved in two ways:
1. *with the left mouse button held down click in the* ***working area***
2. *with a single mouse click in the* ***overview area.***
When the cursor is positioned in the overview area, the zoom factor can be adjusted using the mouse wheel.
The percentage figure in the image (here 54%) shows the current zoom factor of the active image compared to its original resolution in pixel. At 100%, a pixel on screen corresponds to a pixel in the original image.

PRACTICAL HINT
The tools described on the following pages are divided into two types requiring different handling.
mouse tools (such as measurements and the magnifying glass which have to be activated and can then be used with the mouse in the working area) • operated by a simple click (such as rotations or display of a specific grid in the working

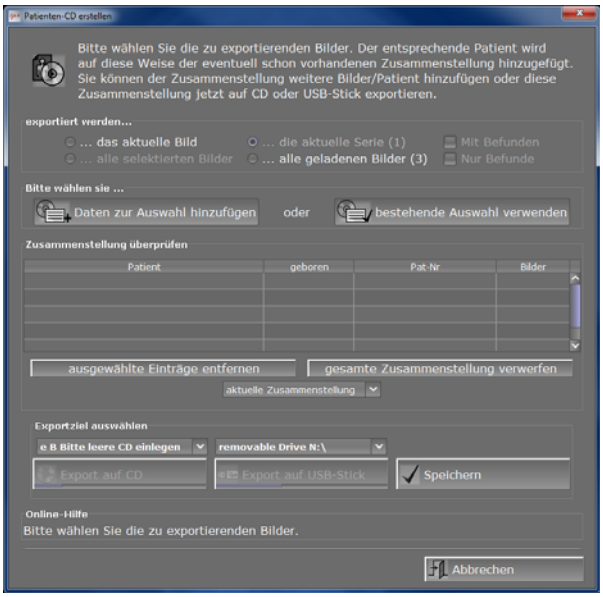
Please activate the image to which the tool should be applied. Afterwards apply the tool with a left mouse click or by pressing the allocated keyboard shortcut.

6.2.1.4 Patient CD - Creating patient CDs and memory sticks

This function copies all displayed or selected images to a CD or memory stick.

NOTE
Before copying, please make sure that all images have been assigned to patient data.

If this is not the case, the appropriate dialogue box will appear.
A free of charge version of ***Eickemeyer®*** will also be copied to the CD or memory stick. There are various ways of using this program module. There are facilities to save lists of previously copied images for further copying later, and to save images on a CD, DVD or memory stick. It is also possible to selectively delete entries from an image list.



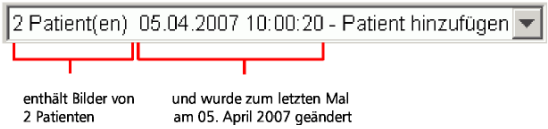
The image selection provides a choice between adding the current image, all selected or all loaded images, or the current series to the currently displayed export list. The number of currently selected and loaded images is shown in brackets after the respective entry. Alternatively, the images currently displayed on the export list could be copied straight to CD/DVD or memory stick without adding further images.

The list of all images to be exported contains the name, DOB, patient ID and number of objects of all patients for whom objects are to be exported. Single entries are deleted by selecting them with the left mouse button and clicking on the button “remove selected entries”. There is also an option to delete the complete list (“discard this compilation”).

NOTE

The viewing application remembers the last 10 export lists so that these may be copied again later.

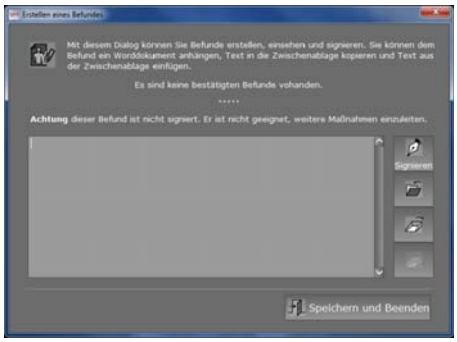
The name of an export list is generated automatically and is assembled as follows:



By clicking the button „use current compilation“ the active displayed export list is used for the patient CD and/or USB stick.
The program automatically creates a list of all CD/DVD drives and connected memory sticks. This list may be used to choose the drive into which to copy the images. The copying process is then started by clicking on the respective button.

6.2.1.5 Create a finding - create findings

The option allows to creating, sign and review findings.



CAUTION

Implements only from version 2.0 onwards.

If a report was created and archived with the report module, then the report is indicated in the dialogue and can be called up from there. Reports are identified by the creation date and time. At a click on the button “Show document” Microsoft Word starts automatically and the report is displayed.
If no signed findings are available, nothing is displayed. Otherwise already signed findings for the current patient are shown with details of the creation date and time of day. The finding is entered into the description field. Because this finding is not signed, an “Attention“ warning appears above the text field. This warning is always there, because a finding cannot be processed and signed at the same time.

Once the finding has been written, it can be signed by a click on the according button. Then it will be signed and entered into the finding list with the creation date and time. Furthermore it can also append a Word document to a finding by clicking on the icon. A dialogue box appears and the required document can be opened by a click on the “Open” button.
If any findings have been created, these are also shown in the navigation bar and while loading images in the image preview. At a left mouse click on the icon “findings”, the dialogue opens.

6.2.1.6 Daily visual check - Daily visual check of the monitor

The monitor and the settings of the graphics card have to fulfil a number of legal requirements if they are diagnostics monitors.

CAUTION
After a successful acceptance test, certain values have to be checked by the operator at defined intervals. The accurate display of **greyscales has to be checked** by sight at least **once a day**.

This tool has been developed to facilitate logging and documentation of this daily test.

If configured a dialogue is shown if no visual check has been conducted on this day when starting the ***Eickemeyer®DX-R***. The test can be done immediately or later. If the test should be conducted later, the dialogue appears again and again during working with the ***Eickemeyer®DX-R***.

After the successful authentication and start of the daily visual check an information dialogue is shown:Start

The test images for the visual check are represented on the monitor after clicking the button “Starts the visual check”. For the daily visual check, SMPTE and an ISO test image are used. The meaningful elements from the question are marked by a briefly flashing white rectangle.

The result dialogue displays the result of the different daily visual check. The test results for a specific period of time can be printed as a report.

CAUTION
If the test result is "failed" and images are loaded in the viewer, a warning triangle is shown. It might be repeating the test but if the test is again "failed" the monitors are not suitable for diagnostic and viewing purposes. The monitors must be checked by an engineer and if necessary adjusted.

6.2.1.7 archive snapshot - archiving the current image as planning documentation

With this tool, a copy of the current image can be saved with all annotations. The current image is archived as a new image together with all annotations, measurements and other changes as a new image in the study.

6.2.2 Tool area „magnifier / zoom“

6.2.2.1 Magnifier - Magnifying glasses

The magnifying glass is activated by clicking on this button. The activated tool is indicated by a mouse pointer in the shape of a magnifying glass, which can be moved across the image. When the left mouse button is held down the magnifying glass takes effect. The magnification is always 100% above the zoom factor of the displayed image. If the image is displayed at zoom factor 100% (original resolution), the area within the magnifying glass is displayed at a zoom factor of 200%, i.e. enlarged by 100%.

NOTE
The magnification process is based on the interpolation of pixels in order to achieve the impression of a smooth image.

PRACTICAL HINT
By default, the magnifying glass is also activated with the right mouse button. This is not the case if the button has been allocated to a different tool (e.g. window level) – please see tool area “Image Selection”.

6.2.2.2 Zoom: 100% - 100 percent representation of the image

After activating this tool the active image is set to its original resolution within its current grid area. This means that each pixel of the displayed image is displayed as exactly one pixel on the screen. Therefore the image is displayed in the original resolution, i.e. the complete image information is shown.
This is an especially important tool for all images whose original resolution is greater than can be actually displayed on screen, e.g. digital X-ray images. These images are generally scaled down in order to display them as a whole, so that only part of the image information is shown. It is very important to view all of the information when making a primary diagnosis. This can be achieved by clicking on the 100 percent button. It is of course possible to enlarge the image further by using the zoom.

NOTE
The 100 percent representation of the image does not conform to the actual size of the depicted object (measured in cm or similar) but only to the resolution of the imaging device (CR, DR).

6.2.2.3 Zoom - Zoom +/- (in / out)

When clicking on these buttons the active image is enlarged or scaled down in pre-determined steps. The same is achieved when the image in the working area is activated and the mouse wheel is turned while holding down the „Ctrl“ key, or the right mouse button is pressed and the mouse wheel is turned.

6.2.2.4 Fit image - Fit image to the grid area

When pressing on this button the active image is displayed in its grid area in its entirety or fitted to the grid area size (i.e. scaled down or enlarged).

6.2.2.5 Fit width - Fit images to the image width

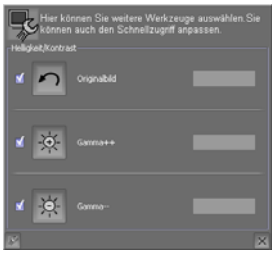
By choosing this button, the currently active image is fitted to the image width.

6.2.2.6 Blackborder on/off - Activating and deactivating the black border

The digital X-ray process usually creates troublesome white borders around the image. By clicking on the blackborder on/off button a black border frame can be activated and deactivated. If the black border is activated, the white borders around the image are coloured black. When the black border is deactivated, the white borders around the image will be displayed again. The saturation of the black border can be set from lightly darkened to 100% black.

NOTE
In the toolbar the currently active image is shown as an overview. Here it is easily visible whether the black border is activated. If it is, the border is represented by hatching. If the black border is deactivated, the image is shown as in normal overview.

6.2.3 *Tool area „brightness“*



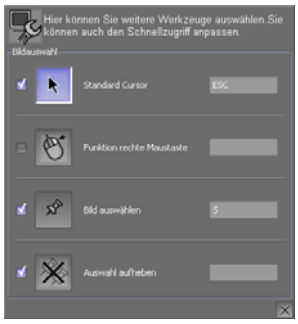
6.2.3.1 Gamma ++/-- - Changing the perceived brightness of an image

These tools allow the user to brighten or darken the image. This is achieved by changing the dynamic range of the image (gamma curve).

6.2.3.2 original image - Resetting the image to default

At a click on this button, all brightness changes (dynamics) are reset to default and the original image is displayed.

6.2.4 *Tool area „image selection“*



6.2.4.1 standard cursor - default cursor

This tool deactivates the last selected tool and returns the default mouse pointer. It may be useful to allocate the key “Esc” to this tool, so that the default mouse pointer will always be displayed on pressing “Esc”.

6.2.4.2 select image - selecting image (pick-up tool)

With the pick-up tool activated, images can be selected on the navigation bar or inside the working area and will be allocated serial numbers. The numbers are shown in yellow inside the image. This function is meant to make a selection of images for further use, i.e. printing or export.

6.2.4.3 deselect all images - Removes selection

Removes selection and numbering from all images at one click.

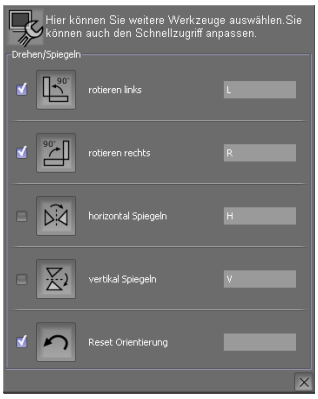
6.2.4.4 tools for right mouse button - Allocate a tool to the right mouse button

The right mouse button can be used for three different functions: magnifying glass, window leveling (brightness and contrast) and zoom. Each function is selected from the configurator. In addition, a keyboard short-cut may be used to switch the right mouse button between these tools.

6.2.5 Tool area „grid“

These buttons are tools to divide the working area into various grids, for example to compare images.

6.2.6 *Tool area „turn / mirror“*



Images can be rotated through 90° clockwise or counterclockwise. At a click on “reset orientation” the image returns to its original orientation.

6.2.7 Tool area „annotations“

The section “annotations” provides a wealth of tools for the measurement of images as well for the drawing of annotations.

6.2.7.1 measure distance - Measuring distances (length)

By clicking on the according button it is possible to measure the distance between two points in the active image. Left click on the starting point, hold the mouse button down and move the mouse pointer to the ending point of the distance to be measured, then release the mouse button.

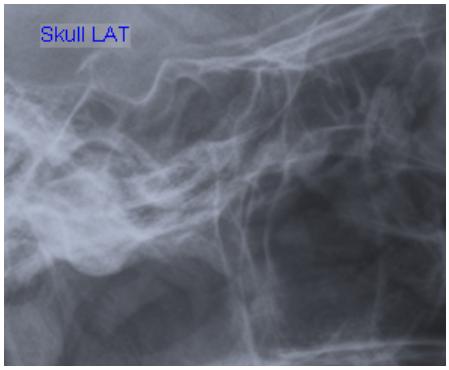
CAUTION
During the process, the running distance will be displayed in **millimetres** (mm). If no reference scale is saved in the image (in the DICOM header), the length will not be specified and is displayed **as pixel**.
Just the measuring line will be displayed. An unlimited number of measurements may be taken before a different tool is selected.

6.2.7.2 measure angle - Measuring angles

Left click with the mouse on the starting point of the first leg of the angle (first line), hold the mouse button down and drag the pointer to the end of the first leg. Then release the mouse button and repeat for the second leg of the angle. The angles measured will be displayed immediately (acute and obtuse angle). The legs do not have to touch, facilitating the measurement of Cobb's angle (for calculations on the spine).

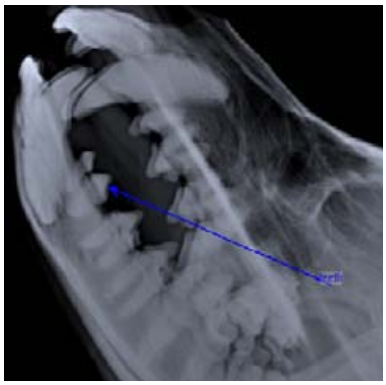
6.2.7.3 text - Entering text into an image or document

After selecting this tool, place the pointer in the position in the image or document where the comment should added. Then left click again. A small white field could be seen. Please enter the text here. On pressing Enter the field is closed and the text will appear semi-transparent



6.2.7.4 draw arrow - Drawing arrows in an image or document

After selecting this tool, place the pointer in the position in the image or document where the tip of the arrow should be appear. Now the length and direction of the arrow can be determine with the mouse button held down. The arrow is defined on release. At the end of the arrow a small white field appears where text can be entered. By pressing the input key (Enter or Return), the text is shown semi-transparently. For an arrow without text, press the input key without entering text.

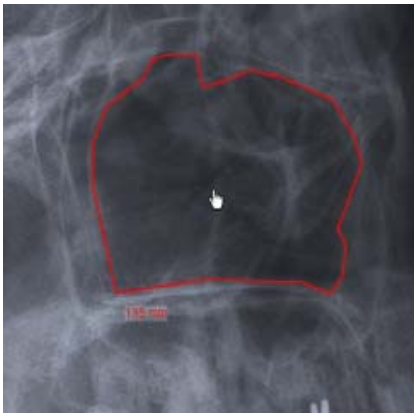


6.2.7.5 remove an annotation - Deleting single measurements or annotations

After activating this tool, bring the mouse pointer over the measurement or annotation to be deleted. All lines, arrows and text appearing in red will be deleted by a left mouse click.

6.2.7.6 edit an annotation - Changing measurements and annotations

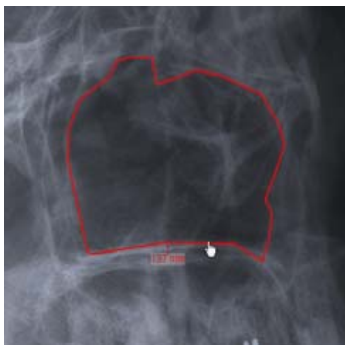
After selecting the tool, move the mouse pointer close to the measurement or annotation to be changed. As soon as it is displayed in red, several options of editing them are available:



1st option: Moving the complete shape

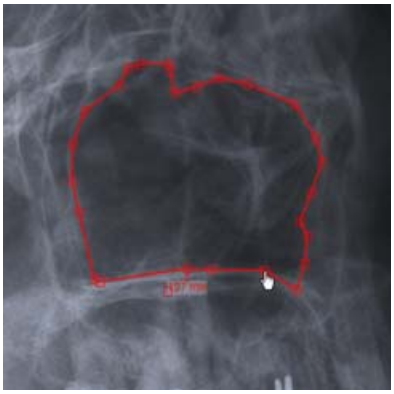
Position the mouse pointer in the middle of the element to be moved (line, ellipse etc.). Once this is displayed in the “active” colour (e.g. red) and no small squares mark its corners, it can be moved as a shape without changing its size or angles. Hold the left mouse button down and drag the shape to the required new position. Release the mouse button.

2nd option: Moving the edges of an element



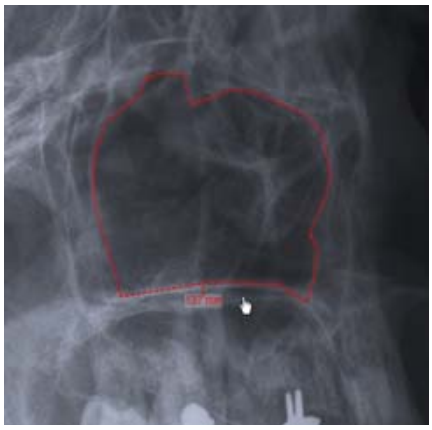
Position the mouse pointer on an edge of the element to be moved (line, rectangle etc.). Once this is displayed in the “active” colour (e.g. red) and no small squares mark its corners, the edge can be moved as a shape without changing its size or angles. Hold the left mouse button down and drag the shape to the required new position. Release the mouse button.

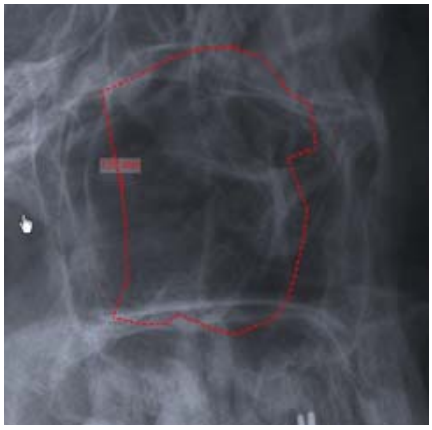
3rd option: Moving a corner point



Position the mouse pointer near to a corner of the element to be edited (line, rectangle etc.). Once this is displayed in the “active” colour (e.g. red) and the small squares mark its corners, click on the corner point to be moved. Now it can be picked up the point and move it to a new position with the left mouse button held down.

4th option: Marking, moving and rotating elements

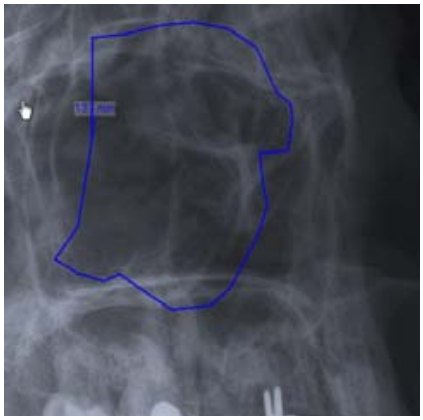




Position the mouse pointer near to the element to be marked (line, ellipse etc.). Once this is displayed in the “active” colour (e.g. red) and no small squares mark its corners, the element can be marked. Click on the element with the „Shift“ key held down. The line of the element turns in a red dashed line, it has been marked. In the same way further elements can be marked.
The marked elements can be moved or rotated completely.
To move marked elements, hold the left mouse button down and drag the shape to the required new position. Release the mouse button.
With „Ctrl“ key and left mouse button held down, the marked elements can be rotated.
If the marking should be cancelled, click without pressing a key beside the elements.

5th option: Rotating elements without prior marking

Position the mouse pointer near to the element to be rotated (line, ellipse etc.). Once it is displayed in the “active” colour (e.g. red) and no small squares mark its corners, the element can be rotated with „Ctrl“ key and left mouse button held down.



6.2.7.7 annotations on/off - Hide / show measurements and annotations

At a click on the button, all measurements and annotations are hidden or shown

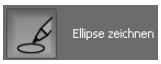
6.2.7.8 density within a line - Measuring density over a line

When the tool is activated, the density value of the pixel currently under the pointer is shown. Left click on the starting point of the measurement, hold the mouse button down and drag to the end of the line. On release, the average density over the measuring line is immediately displayed next to it.

6.2.7.9 density within a rectangle - Measuring density over a rectangle area

When the tool is active, the density value of the pixel currently under the pointer is shown. Left click on the starting point (one corner of the rectangle) hold the mouse button down and drag to the diagonally opposite corner of the rectangle. The average density over the area is displayed next to it immediately after releasing the mouse button.

6.2.7.11 draw ellipse - Drawing an elliptical shape



After selecting this tool, left click on the starting point (one corner of a hypothetical rectangle surrounding the circle or ellipse) hold the mouse button down and drag to the diagonally opposite corner of the rectangle. The ellipse is defined on release. At the end of the ellipse a small white field appears where text can be entered. By pressing the input key (Enter or Return), the text is shown semi-transparently. For an ellipse without text, press the input key without entering text.

6.2.7.12 multi line / polygon - measuring length of an irregular shap

Measuring an open shape:

Activate the tool by left clicking on the button. Now left click in the working area on the starting point of the shape to be measured. Then click on the second corner point of the shape, and continue until it has been reached the end of the shape. Double click on the last point to be included. The current accumulated length is always displayed during the process, and the total length is displayed after double clicking on the last point.

Measuring a closed shape:

Activate the tool by a left click on the button. Afterwards click in the working area on the starting point of the shape to be measured. Then click on the second corner point of the shape, and continue until it has been reached the end of the shape. The current accumulated length is always displayed during the process. To close the shape, bring the mouse pointer near the starting point. Now all points will be marked with small squares. Left click once to close the polygon.

PRACTICAL HINT

If a shortcut for the zoom tool (e.g. the key “+”) is defined it can be easily zoom into the image whilst annotating it to facilitate accurate drawing.

6.2.7.13 draw blackborder - Drawing a frame for a black border

The digital X-ray process usually creates troublesome white borders around the image. These can be coloured black by using the black border.
The saturation of the black border can be configured by an authorised dealer. It can be set from slightly darkened to 100% black.
By clicking on the according button a "frame" can be drawn around the image. After activating the button, click with the left mouse button, on the left upper corner of the displayed X-ray image. Drag the mouse to the end of a line and then press the left mouse button again. By moving the mouse now, a rectangle is formed. Once the rectangle has the desired size, click the left mouse button again. The image is shown immediately with the activated black border. A further click on this button can change the "frame". The black border turns white again and the rectangle can be edited.
If the mouse is positioned near a corner of the rectangle, a small square is shown. With the mouse on the square and its left button held down, the rectangle can be rotated around its opposing corner. The size of the rectangle can be changed with the left mouse button held down on the respective edges of the rectangle.
Once the frame is in the desired position, the black border can be activated by clicking on the button "Activating and deactivating the black border".
Beside a digital X-ray image with drawn frame without activation of the black border and a further image with activation of the black border are shown.

6.2.7.14 centerline - Inserts a centre line to determine the axis of a diaphysis

By activating this function a centre line for the determination of a diaphysis axis is inserted. Position the mouse pointer near to the end of the centre line. Once it is displayed in the “active” colour (e.g. red) and the small squares mark its corners, click on the corner point to be moved. Now the point can be picked up and moved to a new position with the left mouse button held down.

Position the mouse pointer in the middle of a centre line to be moved. Once it is displayed in the “active” colour (e.g. red) and no small squares mark its corners, it can be moved as a shape without changing its size or angle. Hold the left mouse button down and drag the centreline to the required new position. Release the mouse butto

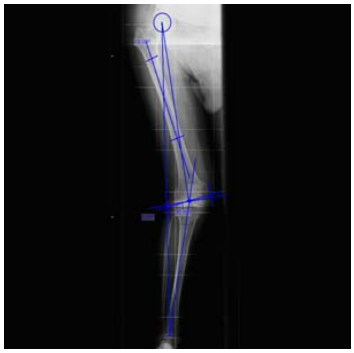
6.2.7.15 centerpoint - Annotation to determine a centre point

Use this annotation to determine for instance the centre point of a knee. After inserting the annotation it can be processed then as follows:
Position the mouse pointer near to the end of the annotation. Once it is displayed in the “active” colour (e.g. red) and the small squares mark its corners, click on the corner point to be moved. Now the point can be picked up and moved to a new position with the left mouse button held down.

Position the mouse pointer in the center of the annotation to be moved. Once it is displayed in the “active” colour (e.g. red) and no small squares mark its corners, it can be moved as a shape without changing its size or angle. Hold the left mouse button down and drag the annotation to the required new position. Release the mouse button.

6.2.7.16 hip leg statics - Inserts a annotation to determine the hip-leg statics

By clicking on this button a complex annotation appears to determine the hip-leg statics. The annotation consists of a centre line, an annotation to determine the centre point of knee, and an annotation to determine the statics. This annontation can be processed in the same way as all other annotations.



6.2.7.17 measure obliquity - Vertical and horizontal obliquity

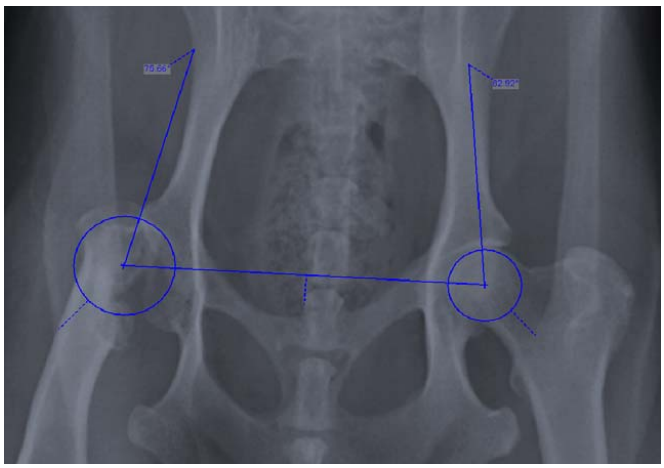
By clicking on one of these buttons, for instance the angle of the pelvic obliquity can be determined in the active image. Left click on the starting point, hold the mouse button down and move the mouse pointer to the ending point of the line to be measured. Then release the mouse button. For a horizontal obliquity, a dashed horizontal line is displayed as the basis for determining the angle. For a vertical obliquity, a dashed vertical line is displayed as the basis for determining the angle.

NOTE
The angle between the plotted and the dashed line is shown in degrees °.

Horizontal and vertical always refer to the monitor, regardless of how the image has been rotated.

6.2.7.18 HD measurement - Measuring hip dysplasia (mainly in veterinary)

The dislocation of the hip joint can be determined by means of the HD measuring tool, which exactly measures the angle (Norberg angle) between the centre of the femur head and the front edge of pan. Clicking on the button inserts the annotations required for HD measurement in the image. The measurement is positioned exactly by adjusting the various points, lines and/or circles. If the image has a reference scale (in the DICOM header) the distance between the centres of the circles is indicated in millimetres, and the area of the circles in square millimetres. Otherwise, distances and areas are not indicated.



6.2.7.19 marker - Insertion of Left / Right position marker

By clicking on one of these both buttons an “L” or “R”, for “left” and “right”, can be inserted in the respective position.

6.2.7.20 clear all annotations - Deleting all measurements and annotations

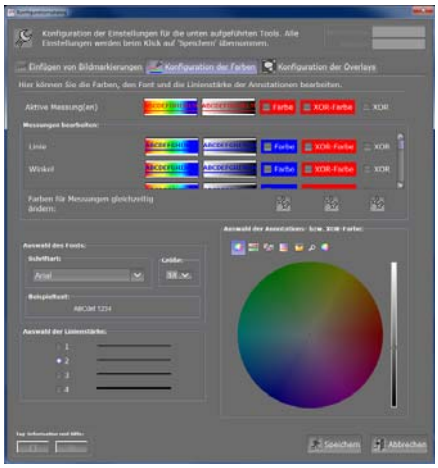
At a click on this button, all measurements and annotations will be deleted.

NOTE
Please note that this action cannot be “undone”.

6.2.7.21 Configuration of the section measurements / annotations

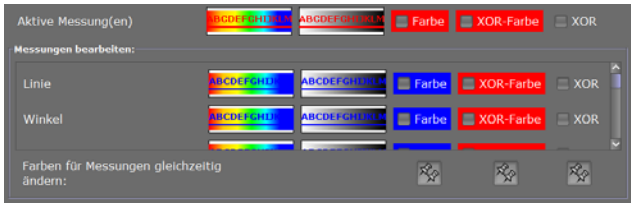
Configuration of annotation colour:

With this configuration dialogue the colour can be processed, the font and the line width of annotations.



NOTE
The "active" annotation colour is the colour which is shown while drawing the annotation; the normal colour is the colour in which the annotations are represented after completion of the drawing.

If the check box is ticked next to "Colour" in the active measurements section, the “active” colour can be changed by clicking into the colour selection field.



If an image is shown in the viewer, sample annotations are displayed in the active colour when the colour box is ticked. When the colour is changed this is made visible immediately in the viewer.
In order to change a colour for more annotations, the check boxes next to "colour" of the appropriate annotation must be ticked. If an image without annotations is displayed in the viewer, a sample annotation is shown.

PRACTICAL HINT
By clicking on the button below the colour selection boxes, the colour of all annotations can be processed at the same time. By renewed clicking on the button the check boxes are cleared again.

Additional XOR colours can be assigned to the annotations. The use of XOR colours is especially suitable for images on b/w monitors. Because the grey tones in an image may differ considerably, it can be difficult to set a colour for a line that is clearly visible in all parts of the image. Through

the use of the XOR colour the line "adapts" to its environment, i.e. in a dark area the line becomes brighter, while in a bright area, the line becomes darker.

The XOR colour results from a synthesis of the following three colours:

1. the current colour used for the annotation (selected as "colour")
2. the colour selected as XOR colour
3. the current colour of the pixel (the background colour on which the annotation is drawn)

When drawing in red on a white pixel and a green XOR colour, the annotation is shown in blue.
After ticking the check boxes next to XOR colour, the XOR colour can be selected. When clicking in the check box next to XOR, the XOR colour for the respective annotation is used; i.e. the annotation is displayed in the colour that results from the XOR function.
In order to set the XOR colour and/or the use of the XOR colour for all annotations, the appropriate button can be clicked. All check boxes are activated and/or deactivated.
By clicking on the colour selection field the colour of the selected colour and/or XOR colour boxes can be changed.

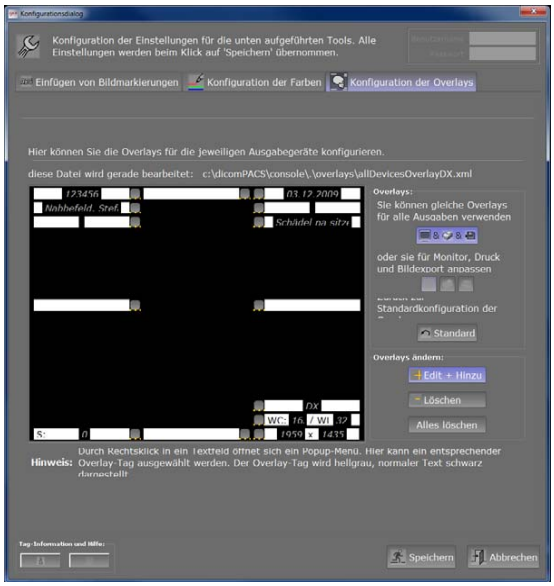
In the font selection field the desired font can be selected. The font size can be likewise selected or directly typed into the selection field. Changes to the font are immediately visible in the sample text.
The line width of the annotations can be selected by clicking into the round box next to the lines.

Configuration the overlays:

In this configuration dialogue, the overlays for all or for the different output devices (monitor, print and export) can be processed. Overlays are information that is incorporated in DICOM images, like e.g. patient data, modality, creation date and further examination-related data.

In the following image overlays are shownOverlays

If for example a CR image is loaded, the overlays for CR images are configured. When exiting the dialogue, the CR image is shown with the newly configured-overlays.



The overlays can be configured for all output devices. The button for all
devices is activated and the buttons for the specific devices are greyed out and cannot be selected. If something is changed it affects the display of the overlays for all devices (monitor, print and export). There is only one configuration file (XML file).
The display of the overlays can also be configured separately for the respective devices. The button for all devices has to be deactivated by left clicking. Now the configuration for the monitor is shown. By clicking on the according buttons the respective configuration can be displayed and edited. A configuration file (XML file) is created for each device. In order to return to the display for all devices, the according button is again activated. The files for the different devices are then deleted.
By clicking on the "Default" button the standard configuration of the overlays is displayed. From here, new changes can be entered.

If the button „Edit + Add“ is selected, text can be written into the lines at a mouse click. The text is shown in black. When right clicking into a text field, a pop-up menu appears from which the overlay tag can be selected.

NOTE
An overlay tag is a part of the information stored in the image, e.g. patient data or study data. The overlay tag is shown in light grey. If no overlay tag is to be inserted, the popup menu can be closed by clicking outside the popup or press the „Ecs“ key. If a tag is already contained in an overlay tag field (black background), the popup menu appears at a left or right mouse click. The overlay tag can be changed.

Clicking again outside the popup menu before selecting another tag will close the popup without applying any changes.
Clicking on the “plus” sign before the text field will insert a new line below the text field.
If the „Delete“ button is selected, “minus” signs appear before the text fields.
If there is more than one row at a given position (e.g. top left), the entire row is deleted by clicking on the “minus” sign. If there is only one row at a position, only the contents of the row are deleted; the text field is not deleted so that new entries can be made.
By clicking on the button „Deletes all“ all text fields are deleted, so that no overlays remain. All rows are deleted and an empty text field appears at each position.

6.3 The working area

The working area is used to display the loaded images. Additional information on the images, such as patient name, date of birth and examination details may be shown (see tool “Show annotations”).
The tools and settings from the tool bar always apply to the currently “active” image. An image is activated by a mouse click on it or by positioning the mouse cursor over it and turning the mouse wheel. A red frame around the image confirms its active status.
A yellow number indicates a selected image and shows the image’s position within all currently selected images.

Mouse button - functions

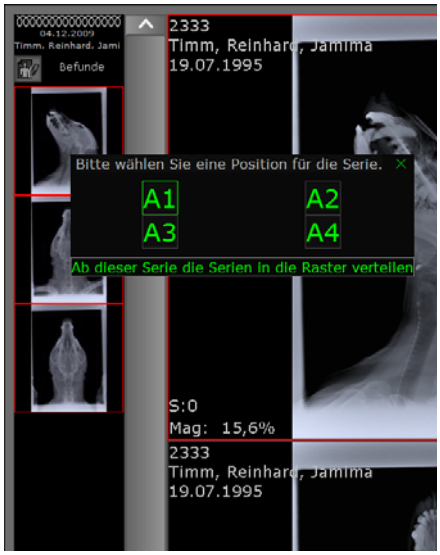
Functions on the left mouse button:
- Moves image within its grid area (PAN tool) (hold down the mouse button)
- Applies the tool selected from the tool bar (e.g. measurement, magnifying glass, annotation etc.)

Functions on the right mouse button:
- Applies the tool allocated to the button (e.g. window level, magnifying glass, etc.)
- Zoom: the right mouse button is pressed and the mouse wheel is turned

Funtions on the mouse wheel:
- Zoom: the Ctrl-key is pressed and the mouse wheel turned at the same time or the right mouse button is pressed and the mouse wheel is turned

6.4 The navigation bar

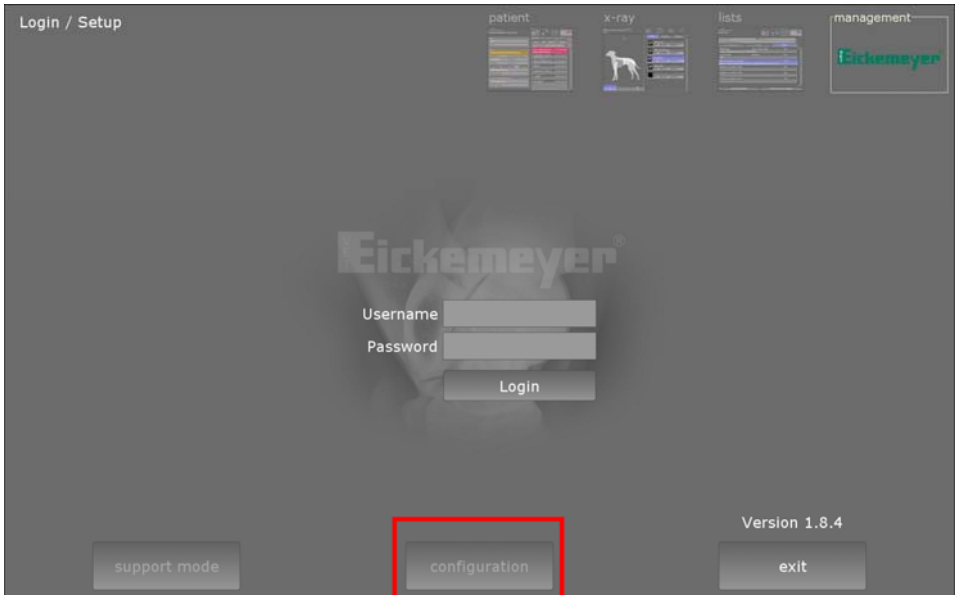
In the navigation bar, all loaded images, series or documents are shown as preview images. At a mouse click on a preview image, the image will be shown in the working area. If the working area is already divided by a grid, e.g. A1 – A4, the navigation bar will show a popup menu where the grid area can be selected where the respective image should be displayed. Thus the images can be arranged within the grid at will.
The option „Start relocating series into matrix from here“ offers the opportunity to distribute the images from the navigation bar into the grid area by the shown order automatically. It starts with the chosen image.
When many images have been loaded, the visible part of the navigation bar may be moved using the scroll bar or the mouse wheel.
The activated pickup tool can be used both, inside the working area and for the preview images of the navigation bar.
All marked images are available for further use, e.g. for printing, export, creation of a patient CD or similar.



6.5 The information bar

The information bar provides the patient data for the currently loaded images and the total size of all marked images. This information is given in MBytes and helps to estimate the amount of data to be exported to a CD or similar.

7. Configuration



7.1 Configuration of examinations and macros

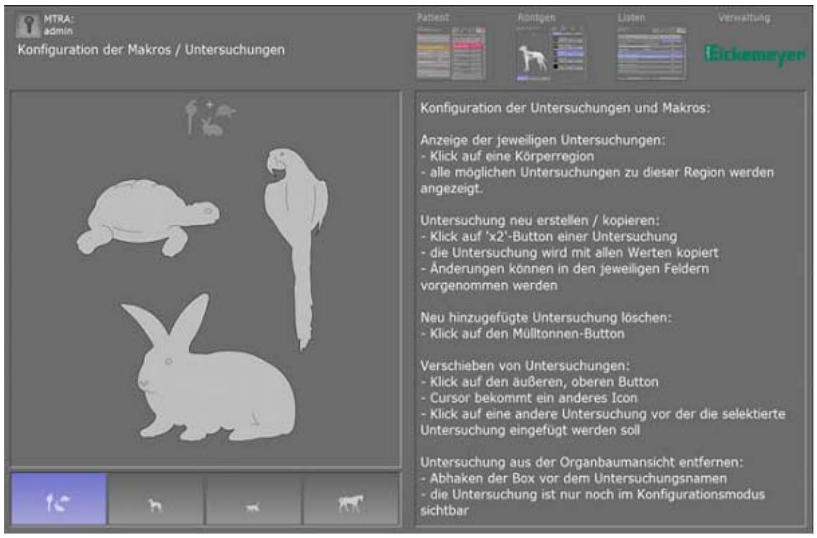
To configure examinations and macros change to the „configuration“ mode by click to „management“ afterwards to „configuration“ button.

The configuration mode is displayed and allows adjusting or extending the organ structures for the species provided by the manufacturer for every group, just as create macros for recurring examination sequences.

5 options are available:

- show current examinations
- create new / copy examinations
- delete new added examinations
- move examinations
- remove or hide an examination from the organ tree

7.1.1 Changing the structure of exposures (Bodypart)



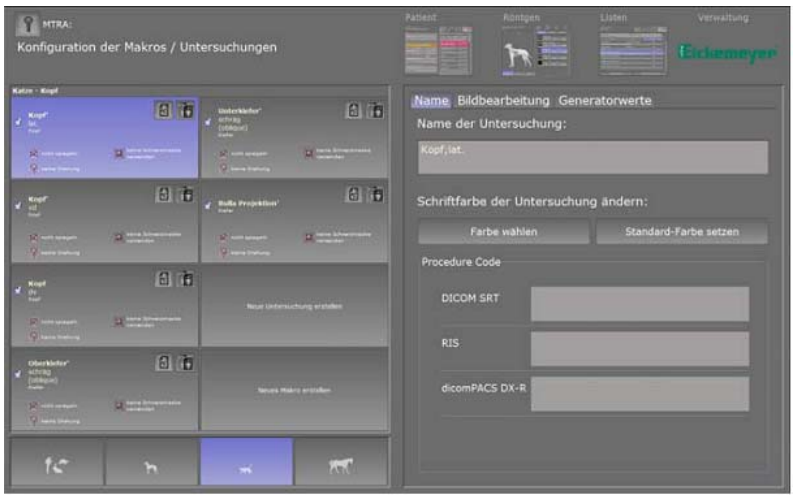
To alter an organ structure, first click on a species and then on the desired body part. If it is wished to create macros applicable to all body parts of the selected organ structure, click on the appropriate icon.
After selecting the desired body part, all available examinations are displayed. The right-hand side of the screen shows various on the selected examination which can also be altered.

7.1.2 Creating a Macro

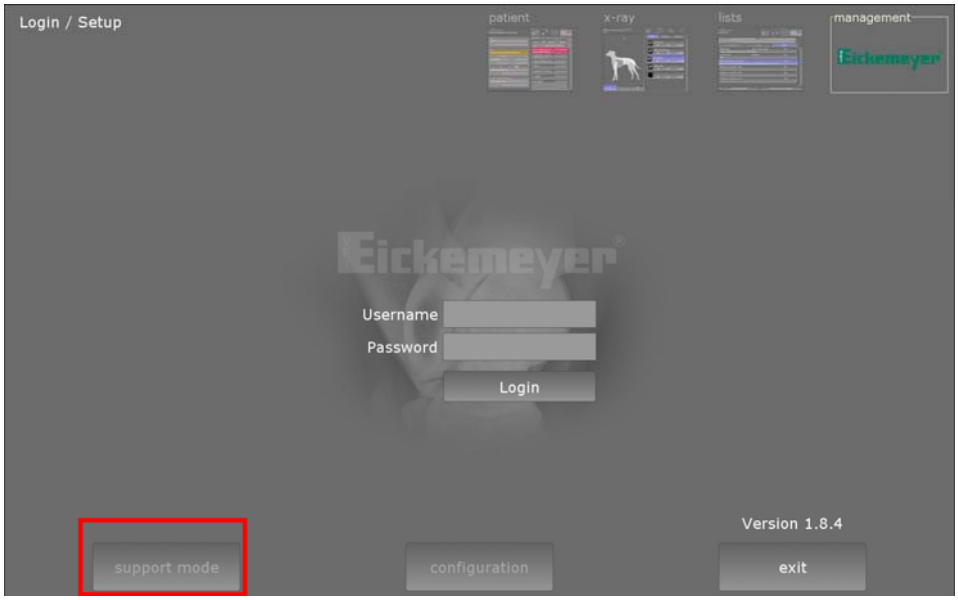
Macros are very useful for simplifying the planning of recurring examination processes, e.g. screening examinations, organs in two planes etc.
The intention is to combine all the necessary exposures for an examination within one macro. If the macro is used at a later stage when planning an examination, the system will automatically enter the saved exposures into the joblist of exposures to be taken in this examination.
This saves a lot of time, since the user does not have to plan each individual exposure every time.

To capture a new macro, proceed as follows:

- Click on the button „Create new macro“
- Enter the name of the macro; the name will appear on the newly created button
- Click on the button „Add examinations“
- Select all examinations, which should be displayed within the macro successively
- Change the sequence of the planned examinations (if required)
- Click on the button „Finished“
- Macro is available for planning



7.2 Support Mode



For the support mode you need a special login and password.
There is a technical manual available. If you are a dealer or technican, please ask for the technical manual.