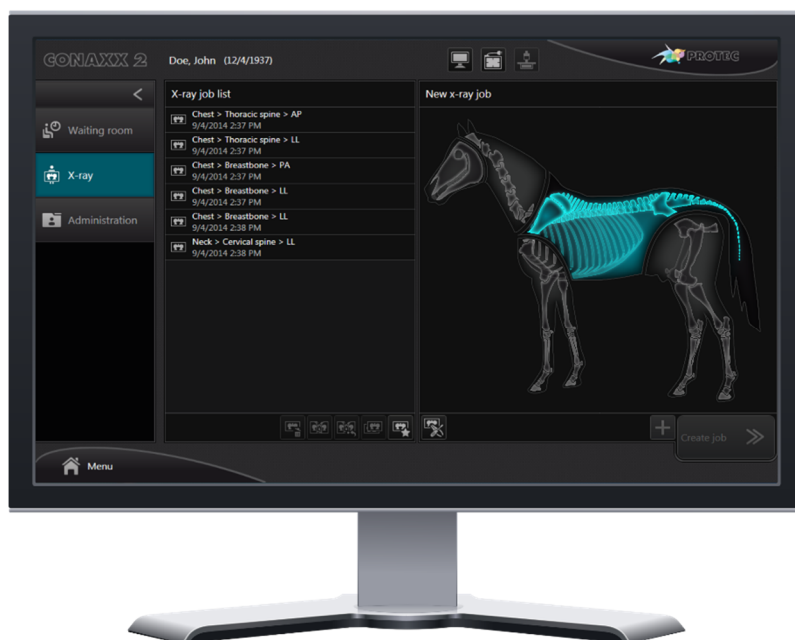# CONAXX 2 VET

X-ray acquisition software

Model/ID: 4330-0-0000

Instruction for use

ID. no. 5330-0-0132

NOTE

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Comments and questions about the documentation, please contact:

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(i) NOTE

The information contained in these instructions for use corresponds to the software status at the date of manufacture. Improvements made after the date of manufacture are described in the current service notes distributed by PROTEC GmbH & Co. KG's technical customer service.

(i) NOTE

These instructions for use describe the entire range of functions of the CONAXX 2 software. Possible optional functions are not specially marked.

Revision Status

Revision	Date	Updated pages	Comments	Author
2.2.1	2024-03-12	all	Original issue	MM
2.2.3	2025-01-17	page 19 page 37	Chapter 3.2.2 Main menu: Function PROPAXX 2 added Chapter 3.3.5.1 Image bar: Button „Open image of another patient" added	MM

Radiation Warning

WARNING!

In these accompanying documents, a system or a component for such a system is documented, which is used for the intended generation of X-rays in medical diagnostics.

X-rays are ionizing radiation that can cause damage to living organisms (e.g., cancer or mutations).

X-rays represent a potential risk for patients and employees. Therefore, the application of X-rays with a given medical issue, must aim at the minimization of radiation exposure for both groups of people.

The group of people responsible for the application must have the necessary specialist knowledge in accordance with the ordinances and guidelines and apply the procedures for the safe operation of such systems.

The national regulations must also be observed during planning and installation.

The X-rays are created in the X-ray tube by strong braking of previously accelerated electrons, which emit energy in the form of electromagnetic waves. The intensity depends on the set parameters voltage (kV), current (mA) and time (s) on the X-ray generator. The X-rays are only emitted at a radiation exit window of the tube and are limited by the collimator mounted directly below.

The X-ray components from PROTEC used are only devices for the diagnostic area, which can be set up to a maximum of 150 kV. Further information can be found in the technical data inside the instructions for use for the generators, X-ray tubes and collimators.

To the User

ⓘ   **NOTE**

The user of these accompanying documents is required to carefully read through and carefully consider the instructions, warnings and cautions contained therein before starting operation.

Even if you have already used similar software products, there may still be differences in the structure and functional sequence of the software product described here, which have a significant influence on the operation.

Although the product was subject to a risk analysis and the design corresponds to the current state of the art, residual risks remain in clinical use. These are displayed in the following Instructions for use by application limits, contraindications, warnings and precautions.

Installation and configuration of the software described here must be carried out by the authorized and qualified personnel of PROTEC GmbH & Co. KG. Persons who are not employees of the technical service department of PROTEC GmbH & Co. KG are requested to contact the local branch of PROTEC GmbH & Co. KG before starting installation or service work.

For assembly and service works, it is necessary to use the "Technical Description" of the product and to observe the points it contained therein.

ⓘ   **NOTE**

CONAXX 2 is solely determined for applications according with its intended purpose.

1　Product description

1.1　Introduction

The instructions for use describe the performance characteristics and operation required for efficient and effective use of the software CONAXX 2.

Before working with the software CONAXX 2, the complete instructions for use must be read, especially the Safety Instructions and the chapter Handling.

1.2　Description

CONAXX 2 is an intuitive and user-friendly software for the acquisition of X-ray images. Whether at the touch screen or with the mouse, CONAXX 2 guides you efficiently through the individual work steps to the finished X-ray image. Supporting functions such as the radiographic positioning helper or the digital X-ray journal, in which all parameters from the generator and the dose area product measuring device (DAP) are saved for the X-ray image, make work easier and save time.

A generator can be controlled directly from CONAXX 2. In the case of a DR upgrade, this can also be operated as before via the generator control panel if it cannot be integrated digitally.

The transfer of patient data or the transfer of complete X-ray jobs via GDT/BDT/Worklist from an upstream system can be implemented. The transfer to a downstream PACS is automated, whereby several jobs can be started at the same time - e.g., export image to PACS, save image.

If the generator and dose area product measuring device are connected, the X-ray journal automatically supplies all the required patient and X-ray image data.

1.2.1　Modules

The CONAXX 2 software has a modular structure. This means that there is a basic module that can be supplemented with additional modules. These additional modules then unlock additional functions.

Basic module

- Acquisition module – Article-Nr. 4330-0-2000

Additional modules

- X-Ray Journal module - Article - No. 4330-0-2001
- EMR module – Article - No. 4330-0-2006
- E-mail module – Article - No. 4330-0-2007
- Gridline suppression module - Article - No. 4330-0-2008
- DICOM Print module - Article - No. 4330-0-2010
- Generator connection module - Article - No. 4330-0-2012
- Dual Panel module - Article - No. 4330-0-0014
- Patient CD module - Article - No. 4330-0-2015
- Advanced Image Processing module – Article - No. 4330-0-0020
- Diagnostic Viewer module - Article - No. 4330-0-2023
- DICOM Query module - Article - No. 4330-0-2024
- DICOM Worklist module - Article - No. 4330-0-2025
- DICOM Store module – Article - No. 4330-0-2026

1.2.2 System requirements Hardware, Software and Network

(i)   **NOTE**

The system requirements for hardware, software and the network can be found in the technical description.

(i)   **NOTE**

Please note that the country-specific requirements for data protection and IT security are complied with.

1.2.3 Installation

(i)   **NOTE**

The installation of the software CONAXX 2 must be performed by PROTEC service department, or a service company authorized by them.

(i)   **NOTE**

PROTEC® is not liable for any incompatibility or other effects which may arise between this software and with any software already installed on the computer system.

For detailed information, please refer to the technical description of *CONAXX 2*.

Contact information of persons qualified to perform installations are available upon request at:

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Internet: www.protec-med.com

1.2.4 License Conditions

The use of CONAXX 2 underlies the "General Software License Conditions" of PROTEC, which must be confirmed at the first installation. The license conditions can be retrieved in the CONAXX 2 main menu under the point "*Information*" at any time.

1.2.5 General Legal Conditions

CONAXX 2 software is not suitable for long term archiving of the images created. (Does not apply when using the module "Diagnostic Viewer")

Legal guidelines in the form of laws, standards and directives have to be explicitly clarified for the respective site where the device is used. This mainly relates for guidelines concerning long term archiving, handling raw data and the use of suitable image viewing devices.

CONAXX 2 conforms to DICOM standard.

1.3 Performance Characteristics

CONAXX 2 offers the following functions to fulfil its intended purpose:

- Acquiring or receiving patient data

- Creating an emergency patient

- Creation of X-ray jobs

- Setting the X-ray parameters

- Performing exposure

- Image processing

- Application of graphic annotations

- Application of measurements

- Calibration of measurements

- Image export

1.4 Intended purpose

The product CONAXX 2 is a software for image data acquisition, processing, transmission and diagnosis in the conventional radiology.

1.5 Intended user group

The software CONAXX 2 is intended for use only by professional users who are trained in the operation of diagnostic software in accordance with the respective national regulations and who were instructed in the appropriate handling, use and operation as well as in the permitted connection with other medical devices, objects and accessories.

1.6 Technical information

The following processes are applied to the original image data: noise suppression, contrast enhancement and grayscale histogram optimization. It is possible to undo these processes at any time to show the original image data. The revision of these process is stored in the DICOM header.

All images created by CONAXX 2 are stored and transferred to other systems in DICOM file format.

The measuring accuracy of the measuring tools contained in CONAXX 2 is determined by the pixel size (e.g., 150μm) of the modality. The measurement results are rounded to two decimal places in the display.

2 Safety instructions

	NOTE xxx	Contains information that must be observed during operation.

	CAUTION! **xxx**	Contains information which, if not observed, can cause property damage.

	WARNING! **xxx**	Contains information which, if not followed, can cause personal injury.

	WARNING! **xxx**	Warning of radioactive substances or ionizing radiation. Contains information which, if not observed, can cause personal injury.

2.1 General Safety Notes

Settings that are not described in these instructions for use must be made by PROTEC customer service or a service provider authorized by PROTEC based on the technical description of the software.

	NOTE All instructions supplied with the software CONAXX 2 must be observed and the safety instructions contained therein must be carefully read and adhered to.

	NOTE After the initial installation, the commissioning must be recorded with the PROTEC acceptance protocol FB-04-07A6.

CAUTION!

The instructions for use contain all the information relevant to safety in order to generally put the software into operation. The software may only be operated by appropriately trained and trained personnel. In this context, operation is ensured by clear symbols on the control elements. All further information and instructions can be found on the supplied data carrier (USB, CD or DVD). This information applies in its entirety as an appendix to these instructions for use and must be observed.

CAUTION!

The user himself is responsible for the image quality while accepting the image. In the area *"Image viewing"* you can access the raw image at any time to avoid mistakes caused by automatic or manual image processing.

CAUTION

In any case of mistake or doubt or fault a further exposure should be done before confirming the anamnesis.

2.1.1 Requirements for Operation

In case of a malfunction, do not use the software CONAXX 2 anymore and notify PROTEC service department or a service company authorized by them.

2.1.2 Operating Personnel

NOTE

Only trained and authorized personnel are allowed to work with the software CONAXX 2.

2.1.3   Radiation Protection

X-rays can pose a risk to patients and other people if the regulations for the operation of such systems are not observed.

For this reason, the principles of radiation protection must have top priority and must be strictly adhered to:

- **Keeping distance from the radiation source**
  The dosage is reduced as a factor of the square of the distance from a (dot shaped) radiation source, i.e., double distance ¼ dose, triple distance 1/9 dose, etc.
- **Keeping exposure time as short as possible**
  The longer the exposure time, the higher the dose, i.e., halving the exposure time leads to halving the dose, and so on (applies especially to radioscopies; for exposures, the exposure value (mAs) is specified).
- **Utilize shielding and protective clothing**
  The protection value increases exponentially with the thickness of the shielding, i.e., 2 half-value layers weaken a (homogeneous) radiation to 1/4, 3 half-value layers to 1/8 and 10 half-value layers to less than 1/1000 of the initial value.
- **Do not reach into the direct X-Ray beam**
  The dose in the non-attenuated direct beam is about 100 times greater than that in the area of scattered radiation.
- **Utilize personal dosimeters**
  When working with radiation, dosimeters should be used for monitoring that are appropriate for the activity.

Persons who must be in the vicinity of the patient must wear protective clothing (e.g., lead aprons). The same applies to maintenance and repair work.

2.2   Notes on IT security

2.2.1   Obligations of the user to cooperate

The user of the product is responsible for preventing unauthorized access to the product, e.g. by logging out when the product is not used.

3 Handling

ⓘ NOTE

It must be ensured that the principles of radiation protection are always observed (see chapter Radiation Protection).

3.1 Quick guide

This chapter gives a brief introduction about the recommended workflow with CONAXX 2.

3.1.1 Start CONAXX 2

At the first step CONAXX 2 has to be started.

You have to enter a user and the corresponding password to the login dialog. You can select the language of the user interface. Check the option "*Stay logged in*" to login this user automatically for the next session.

3.1.2 Choose patient

In the working area "*Waiting room*" the user can select a patient. To select a patient the user can choose from the patient list or enter a new patient.

3.1.2.1 Choose patient from list

If the area "*Patient list*" contains the desired patient, he can be selected by choosing the corresponding list entry. To confirm the selection, press the button "*Select patient*". Now the patient is active.

3.1.2.2 Create/search owner/patient

If the area *"Patient list"* does not contain the desired patient the user has to create the patient. To create a new patient the user has to enter the owner data into the area "*New owner*" first. Parallel to the input CONAXX searches the owner database. The list *"Search results"* contains all found owners. If CONAXX does not find any suitable owner, the user can select the entry which is marked by a ★ in the first column. This entry stands for a new owner. The button *"Select owner"* confirms the selection.

If the list *"Search results"* contains the desired owner, the user can select him. *"Select owner"* confirms the selection.

Now you can enter the patient data (animal data). Parallel to the input CONAXX searches the patient database. The list *"Search results"* contains all found patients. If CONAXX does not find any suitable patient, the user can select the entry which is marked by a ★ in the first column. This entry stands for a new patient. The button *"Select patient"* confirms the selection.

If the list *"Search results"* contains the desired patient, the user can select him. *"Select patient"* confirms the selection.

After the confirmation the selected patient is active.

3.1.2.3 Create emergency patient

To create a new emergency patient, the user has to click the button "🚑 *Emergency patient*" in the area "*New owner*". The predefined owner data for the emergency patient will be entered automatically. The first entry in the list *"Search results"* contains the owner of the emergency patient and will be marked with the symbol 🚑 in the first column. By clicking the button *"Select owner"* the area changes to "*New patient*". The predefined patient data for the emergency patient will be entered automatically. The first entry in the list *"Search results"* contains the emergency patient and will be marked with the symbol 🚑 in the first column. By clicking on *"Select patient"* the emergency patient will be the active patient and the software

will switch to the working area *"X-ray"* automatically. If there are preconfigured x-ray jobs for emergency patients, these jobs will be created immediately and you can start with the exposure.

3.1.3 Create X-ray job

After selecting a patient CONAXX 2 switches to the working area "*X-ray*". In this area the user can create new x-ray jobs. If the subarea "*New x-ray job*" is not shown automatically, it can be entered by pressing the button 🖳 (*New job*).

The creation of an x-ray job is being performed in three steps by defining body part, fine part and view position. By selection a "QuickJob" one or more jobs can be created skipping the three steps described before.

The homunculus is used to select the body part (e.g., foreleg). After selecting a body part, the user has to select a fine part (e.g. carpus left,…). Afterwards the desired view positions can be selected. The selection will be confirmed with the button "*Create job*" and the new jobs appear in the list "*X-ray job list*".

3.1.4 Prepare x-ray job

To prepare the exposure of an x-ray job the job has to be selected in the "*X-ray job list*". After that the subarea "*Positioning*" appears. The area supports the user to prepare the exposure. It contains an image and text instructions for the recommended exposure positioning for "*Patient positioning*", "*Central ray*" and "*X-ray settings*".

If CONAXX 2 controls the x-ray generator directly, the user will see a subarea *"X-ray generator"*. CONAXX 2 sends automatically the correct x-ray settings to the x-ray generator according to the selected x-ray job. The user can activate different patient anatomies with these buttons:

"extra small 🏋*", "small* 🏋*", "medium* 🏋*"* and *"large* 🏋*"*

To finish the preparations, press the button *"Start exposure"*.

3.1.5 Exposure x-ray image

After starting the exposure by clicking *"Start exposure"* CONAXX 2 activates the modality. The exposure status of the modality will show with the help of status icons and text:

- The modality prepares the exposure.

- The exposure is possible, and the user can execute the exposure.

- The exposure is done and CONAXX 2 is importing the image.

ℹ️ NOTE

Some modalities support only limited time frames for the acquisition. In that case a time bar visualizes the remaining time. After the time has expired the modality will prepare a new time frame for the acquisition.

⚠️ WARNING!

In case of receiving technical incorrectly images (e.g., missing image content, stripes structures) the complete X-ray system must be restarted. Please make afterwards a test exposure without any patient. For a further regularly usage of the system please ensure that the taken exposure is correct. If not inform your technical contact person.

3.1.6 Edit x-ray image

After the exposure CONAXX 2 switches to the subarea "*Image viewing*". In this area the image can be edited (e.g., 📱 or ✂️) and annotated (e.g., Ⓛ, Ⓡ, Ⓒ).

The button *"Accept"* confirms the editing. If an automatic export has been configured, the processing of the x-ray job will be completed now.

If an x-ray job of an emergency patient is being accepted, a message box with the question whether the patient data should be edited before accepting will appear. Clicking on *"Yes"* opens the edit patient data dialog. If you click on *"OK"* in this window after editing, the emergency patient will change to a normal patient. If you click on "*Cancel*" in this window or click on *"No"* in the dialog before, the x-ray job will be accepted and the emergency patient will remain an emergency patient.
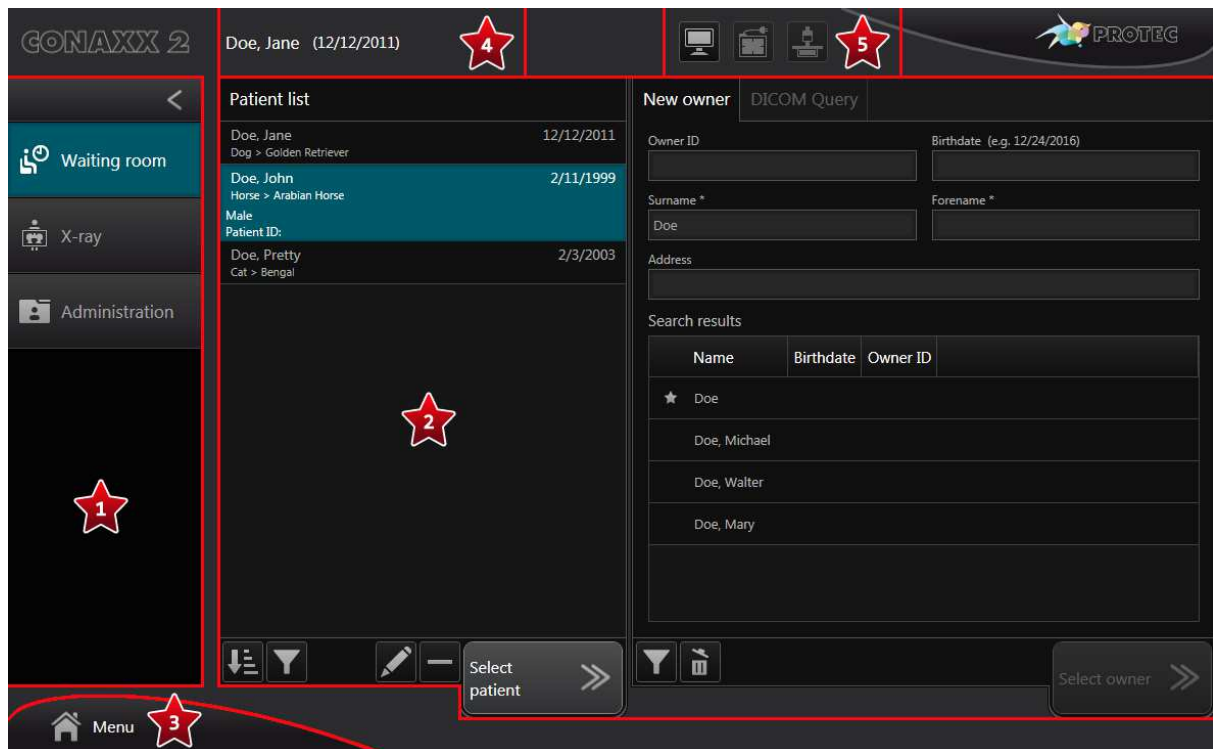
3.1.7 Export x-ray job

After accepting an x-ray job CONAXX 2 switches to the subarea "*Export*". This area is used to export the job.

CONAXX 2 supports different export options like "*Send (DICOM)* 📷" or "*Patient CD* 💿".

3.2   User interface

The CONAXX 2 user interface is separated into the following different areas:

⭐1	-	**Navigation area:** This area enables the navigation between working areas.
⭐2	-	**Working area:** This area shows the content of the current working area, e.g., patient or x-ray job lists.
⭐3	-	**Main menu:** The main menu provides various functions which are required in addition to the normal workflow.
⭐4	-	**Active patient:** If a patient is active, the patient data will be displayed at this position.
⭐5	-	**Status area:** This area provides status information and tools for the components "*system*", "*modality*" and "*x-ray generator*".

3.2.1   Navigation area

This area enables the navigation between working areas. CONAXX 2 provides the working areas *"Waiting room"*, *"X-ray"* and *"Administration"*.

With the help of the button "<" the user can collapse the navigation area and provide more space for other areas.

3.2.2   Main menu

The main menu provides functions in addition to the main workflow. The following functions are provided:

-    **PROPAXX / PROPAXX 2:**
     This function opens the PROPAXX Viewer / PROPAXX 2 Viewer.

-    **X-ray journal:**
     This function opens the X-ray journal. In this journal all exposed x-ray jobs inclusive the used x-ray settings are listed.

-    **Information:**
     This function shows the information dialog of CONAXX 2.

-    **Help:**
     This function shows the user manual of CONAXX 2.

-    **Quick help:**
     This function shows the quick help of CONAXX 2. It contains all executable functions of the current screen.

-    **Remote support:**
     This function starts the remote support tool. With this tool the support staff can help the user.

-    **Configuration:**
     This function opens the configuration of CONAXX 2.

-    **Show Desktop:**
     This function minimizes CONAXX 2 and shows the Windows Desktop.

-    **Log out:**
     This function logs out the currently logged-in user.

-    **Exit:**
     This function quits CONAXX 2.

3.2.3 Status area

This area provides status information and tools for different components:

- **System:**
  This function shows status information of the system.

- **Modality:**
  This function opens the toolbox for the connected detector. It provides functions to establish or close the connection to the detector and status information for the battery charge level.

  Some modalities support special functions, e.g.:

  - turn off the modality
  - transfer the last acquired image again

- **X-ray generator:**
  This function opens the x-ray generator control. It can be used for exposures without acquiring the images by the modality.

  Use this area for the daily warm-up procedure of the X-ray tube.

3.3   Working areas

CONAXX 2 has three working areas (*"Waiting room"*, *"X-ray"* and *"Administration"*). These areas cover the complete workflow of an x-ray job.

3.3.1   Working area "Waiting room"

This working area is used to select a patient. CONAXX 2 includes the possibility to receive patients directly from other systems. These patients appear automatically in the *"Patient list"*. It is also possible to fill the list manually.

3.3.1.1 Patient list

The *"Patient list"* shows all patients whose x-ray jobs are not processed. "Not processed" means the complete workflow for the x-ray job is not finished.

To choose a patient select him in the list and confirm the selection by pressing *"Select patient"*. Now the patient is active.

The "*Patient list*" provides the following functions:

- **Refresh:**
  This function queries the DICOM Worklist interface for new patient and job data. New data will be added to the patient list.

- **Sorting:**
  Use this function to sort the entries in the list.

  The following sort orders are possible:

  - Ascending

  - Descending

  The following sort criteria are possible:

  - Name

  - Birthdate

  - Patient ID

  - Sex

  - Receive time

  - Creation time

  - Creation time of recent x-ray job

- **Filtering:**
  Use this function to control the list content.

  The following contents are possible:

  - All patients

  - Only internal patients

  - Only received patients

- **Edit:**
  Use this function to edit the owner data and/or patient data.

- **Remove:**
  Use this function to remove the patient from the list. The patient will be removed only from the list and not from the database. He can be added to the list at any time.

3.3.1.2 New owner/patient

To create a new owner the user has to enter the owner data into the area *"New owner"*. Parallel to the input CONAXX searches the owner database. The list *"Search results"* contains all found owners. If CONAXX does not find any suitable owner, the user can select the entry which is marked by a ★ in the first column. This entry stands for a new owner. The button *"Select owner"* confirms the selection.

If the list *"Search results"* contains the desired owner, the user can select him. *"Select owner"* confirms the selection.

Now you can enter the patient data (animal data). Parallel to the input CONAXX searches the patient database. The list *"Search results"* contains all found patients. If CONAXX does not find any suitable patient, the user can select the entry which is marked by a ★ in the first column. This entry stands for a new patient. The button *"Select patient"* confirms the selection.

After the confirmation the selected patient is active and CONAXX switches to the working area *"X-ray"*.

If it is necessary to enter additional patient without starting the workflow for the first patient, the user can use the button "✚" instead of *"Select patient"*. In this case CONAXX remains in the working area *"Waiting room"* and the user can enter or select another patient.

To reset the input fields and the search results use the button " 🗑 ".

If you want to return to the new owner area from the new patient area you have to use the button "≪".

Columns in the area "*Search results*" can be shown or hidden with the button "▼ ".

To create an emergency patient, click the "🚑 *Emergency patient*". This will enter the predefined owner data for the emergency patient automatically. The first entry in the list *"Search results"* contains the owner of the emergency patient and will be marked with the symbol 🚑 in the first column. If any owner data is available, it can be corrected in the corresponding input fields. By clicking the button "*Select owner*" the area changes to "*New patient*". The predefined patient data for the emergency patient will be entered automatically. The first entry in the list "*Search results*" contains the emergency patient and will be marked with the symbol 🚑 in the first column. If any patient data is available, it can be corrected in the corresponding input fields. By clicking on *"Select patient"* the emergency patient will be the active patient and the software will switch to the working area *"X-ray"* automatically. If there are preconfigured x-ray jobs for emergency patients, these jobs will be created immediately and you can start with the exposure.

If all owner / patient data is available after clicking on the button "🚑 *Emergency patient*", the emergency patient mark can be removed by clicking again on the button "🚑 *Emergency patient*". The patient will be then handled as a normal patient.

3.3.1.3   DICOM Query

In this area the user can query patients from external PACS. To start a query the user has to enter search criteria for the desired patient. To start the query process press *"Search"*.

The area *"Search results"* provides a list with all found patients. Select the desired patient and confirm by pressing *"Select patient"*. CONAXX 2 switches automatically to the working area *"X-ray"*.

If it is necessary to import additional patients without starting the workflow for the first patient, the user can use the button "✚" instead of *"Select patient"*. In this case CONAXX 2 remains in the working area *"Waiting room"* and the user can enter or select another patient.

To reset the input fields and the search results use the button " 🗑 ".

3.3.2 Working area "X-ray"

This area provides functions to create and process x-ray jobs of a patient. Already existing x-ray jobs are shown in the *"X-ray job list"*.
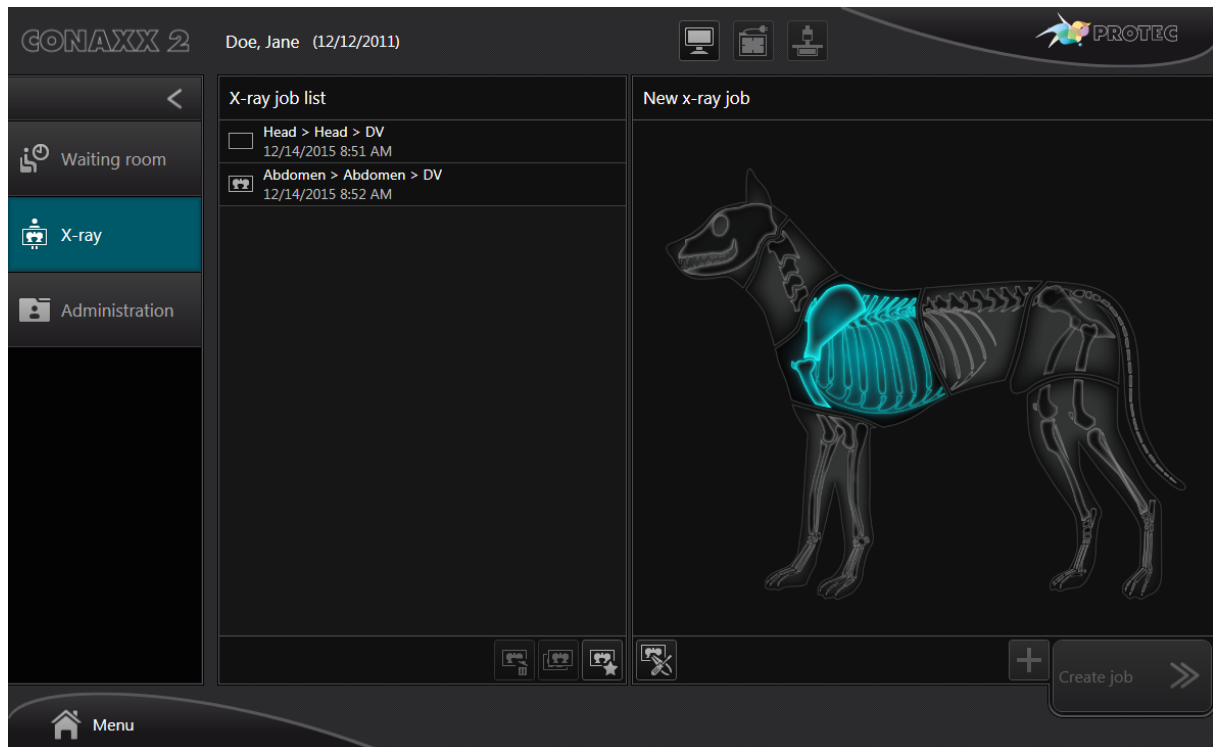
3.3.2.1 Status of x-ray jobs

An x-ray job has a unique status. CONAXX 2 supports the following status:

- **Status "created":**
  Jobs with this status are only created. They contain no image data.

- **Status "exposed":**
  Jobs with this status are exposed and contain image data.

- **Status "accepted":**
  Jobs with this status are exposed and the user has already edited and accepted the job.

- **Status "exported":**
  Jobs with this status are accepted and successfully exported.

- **Status "export failed":**
  If the automatic export of a job fails, the job gets this status. The export must be repeated manually.

3.3.2.2   X-ray job list

The *"X-ray job list"* contains all jobs which workflows are not finished. After exporting a job, the workflow is completed but the job remains in the list. The job disappears when the patient is selected a second time.

To choose an x-ray job the user has to select the desired entry in the list. CONAXX 2 shows a subarea according to the status of the job.

The following functions are provided for the *"X-ray job list"*:

-   **Sort:**
    This function displays additional buttons for sorting the X-ray job list.

-   **Delete job:**
    Use this function to delete an x-ray job.

-   **Duplicate job:**
    Use this function to duplicate the selected job. This is useful to repeat exposures.

-   **Create new job:**
    Use this function to create new x-ray jobs.

3.3.2.3   New x-ray job

In this area the user can create new x-ray jobs.

The creation of an x-ray job is being performed in three steps by defining body part, fine part and view position. By selecting a *"QuickJob"* one or more jobs can create directly.

The homunculus is used to select the body part (e.g., foreleg). After selecting a body part, the user has to select a fine part (e.g. carpus left,…). Afterwards the desired view positions can be selected. The selection will be confirmed by pressing the button *"Create job"* and the new jobs appear in the list *"X-ray job list"*.

After the creation of the job the new job is selected automatically in the list. CONAXX 2 closes the area *"New x-ray job"* and shows a new subarea (e.g., *"Positioning"*) according to the workflow.

To remain in the area *"New x-ray job"* and create more x-ray jobs use the button "**+**" instead of *"Create job"*.

To create test exposures (e.g., constancy test) use the button "🖼️".

To return from the fine part selection to the body part screen use the button "≪".

3.3.2.4   Positioning

This area supports the user while preparing the exposure. It contains an image and text instructions for the recommended exposure positioning for *"Patient positioning"*, *"Central ray"* and *"X-ray settings"*. Optionally it is possible to show an image e from a real acquisition.

If CONAXX 2 do not control the x-ray generator the exposure can be started now with the button *"Start exposure"*.

3.3.2.5 X-ray generator

In this area the user can control the x-ray generator. CONAXX 2 automatically sends the correct x-ray settings to the x-ray generator according to the selected x-ray job. The user can activate different patient anatomies with these buttons:

"extra small ⚖️*", "small* ⚖️*", "medium* ⚖️*"* and *"large* ⚖️*"*

The following functions can be used in this area:

- **Organ program "extra small"**

- **Organ program "small"**

- **Organ program "normal"**

- **Organ program "large"**

- **Workstation "free"**

- **Workstation "table"**

- **Workstation "wall"**

- **Exposure technique "1-point":**
  kV & measurement chamber

- **Exposure technique "2- point":**
  kV & mAs

- **Exposure technique "3- point":**
  kV & mA & ms

- **Focus "small"**

- **Focus "large"**

- **Measurement chamber "left"**

- **Measurement chamber "middle"**

- **Measurement chamber "right"**

- **Tube energy "low"**

- **Tube energy "normal"**

- **Density**

- **Increase parameter:**
  Increases a parameter, e.g., kV.

▼   -   **Decrease parameter:**
Decreases a parameter, e.g., kV.

   -    **Toggle parameter:**
Toggles through all possible values of a parameter.

   -    **Save:**
Saves the current parameter to an organ program.

ⓘ   **NOTE**

According to the connected x-ray generator the range of functions differs.

After setting up all required x-ray parameters the exposure can be started by pressing *"Start exposure"*.

Additional information about the inserted grid will be displayed if the grid monitoring is active.

   -    **No grid inside workstation table**

   -    **Grid 1 inside workstation table**

   -    **Grid 2 inside workstation table**

   -    **Grid 3 inside workstation table**

   -    **No grid inside workstation wall**

   Grid 1 inside workstation wall

   Grid 2 inside workstation wall

   -    **Grid 3 inside workstation wall**

   -    **Grid monitoring failed**

3.3.2.6 Exposure

After starting the exposure by clicking *"Start exposure"* CONAXX 2 activates the modality. The exposure status of the modality will be shown with the help of status icons and text:

✖   -   The modality prepares the exposure.

   -    The exposure is possible and the user can execute the exposure.

   -    The exposure is done and CONAXX 2 is importing the image.

> **NOTE**
>
> Some modalities support only limited time frames for the acquisition. In that case a time bar visualizes the remaining time. After the time has expired the modality will prepare a new time frame for the acquisition.

After importing the exposed image CONAXX 2 will switch automatically to the area *"Image viewing"*.

To abort the exposure, use the button *"Cancel"*.

Directly after the exposure CONAXX 2 will create an entry in the x-ray journal. CONAXX 2 tries to fill out all values automatically. If there is missing data, the user has to complete them.

> **WARNING!**
>
> **In case of receiving technical incorrectly images (e.g., missing image content, stripes structures) the complete X-ray system must be restarted. Please make afterwards a test exposure without any patient. For a further regularly usage of the system please ensure that the taken exposure is correct. If not inform your technical contact person.**

3.3.2.7 Image viewing

In this area the image can be optimized and edited.

The following functions can be used:

- **Tool "windowing":**
  This tool allows the adjustment of the windowing (brightness and contrast) by moving the mouse around with a pressed mouse button.

- **Tool "magnifier":**
  This tool activates the magnifier. The magnifier follows the mouse pointer. By clicking the button again, the tool will be deactivated.

- **Full windowing:**
  Resets the windowing and show all gray values of the image.

- **Automatic windowing:**
  Fits the windowing optimally to the image content.

- **Rotate left 90°:**
  Rotates the image 90° counterclockwise.

- **Rotate right 90°:**
  Rotates the image 90° clockwise.

- **Flip horizontal:**
  Flips the image along the vertical axis.

- **Flip vertical:**
  Flips the image along the horizontal axis.

- **Free rotation:**
  Rotates the image according to a user defined alignment line.

Crop:
Crops the image according to a user-defined cropping frame.

Electronic shutter:
The electronic shutter is applied by a user-defined frame. Outside the frame the image will be displayed black.

Annotation "laterality marker left":
Inserts the annotation "laterality marker left" at a user defined position into the image.

Annotation "laterality marker right":
Inserts the annotation "laterality marker right" at a user defined position into the image.

Annotation "text":
Inserts a text annotation at a user defined position into the image. The user can choose between predefines texts or enter an own text.

Select all annotations:
Selects all annotations which are placed in the image.

Delete selection:
Deletes all selected annotations in the image.

AIP filtering:
Provides image optimizations through intelligent filter functions. According to the body part the routine provides different filter strengths from soft to strong (🖋,🖋,🖋,🖋). To reset the filter function, use the button "•↩". To use the current filter for future jobs with the same organ press the button "💾".
The button "⯮" is used to open the Professional Image Tuner. If parameters have been defined for the professional image tuning, these parameters can be activated or deactivated via the button "⯮PIT".

Grid line suppression:
Activates the automatic grid line suppression.

Reset changes:
Resets all changes which were made by the user.

Raw image:
Resets all changes in the image. Also automatic optimizations of CONAXX 2 while importing the image from the modality.

The area *"Image viewing"* provides the following common functions:

Delete image:
Deletes the exposure and image data. After that the x-ray job is ready for a new exposure. Depending on the configuration, the reject reason must be specified when deleting.

Fail assignment:
This function can be used to change the body part of the x-ray job or move the image to another patient. In case of changing the body part CONAXX 2 will re-optimize the image data.

Create x-ray journal entry:
Creates an x-ray journal entry for this x-ray job.

Image properties:
Edit image properties, e.g., image comment or image keyword.

Exposure index mask:
The exposure index mask can be displayed and edited.

- **Technician tool:**
This function is available only when a test x-ray job (e.g., Test > Homogeneity > AP) was selected in the x-ray job list. Predefined windowing values can be used, edited and deleted.

The button "*Diagnosis*" switches into the "*Diagnosis*" area, where the image can be opened for further editing and optimization. See chapter "Diagnosis"

To finish the editing the button "*Accept*" can be used. If an automatic export has been configured, the processing of the x-ray job will be completed now.

If an x-ray job of an emergency patient is being accepted, a message box with the question whether the patient data should be edited before accepting will appear. Clicking on "*Yes*" opens the edit patient data dialog. If you click on "*OK*" in this window after editing, the emergency patient will change to a normal patient. If you click on "*Cancel*" in this window or click on "*No*" in the dialog before, the x-ray job will be accepted and the emergency patient will remain an emergency patient.

Afterwards CONAXX 2 select the next x-ray job in the "*X-ray job list*" automatically. If the next job is already accepted, CONAXX 2 will show the subarea "*Export*".

3.3.2.8 Export

This area is used to export the x-ray job. CONAXX 2 supports several export options:

- **Send (DICOM):**
Send the x-ray image via DICOM Store to an external PACS.

- **Send (E-mail):**
Send the x-ray image as an e-mail attachment. The default e-mail client of the operating system will be used for this function.

- **Save as:**
Saves the x-ray image in different image formats (DICOM, DICOM (anonymized), Bitmap, JPEG, PNG, TIFF) to hard disks or mobile media.

- **Print:**
Prints the x-ray image on a Windows printer.

- **Print (DICOM):**
Prints the x-ray image on a DICOM printer.

- **Print (DICOM):**
Adds the x-ray image to print list for the DICOM Print layout.

- **Patient CD:**
Burns the image on an optical media. After entering the media description the user has to define burn properties e.g. burn device or burn speed.

- **Patient CD (Export):**
Saves the images into a folder. After entering the media description the user has to define the export folder.

Send GDT reply:
Generates and sends a GDT message as a reply.

After the successful export the x-ray job is considered to be processed. If this job is the last unprocessed one, the patient will be removed automatically from the *"Patient list"* in the working area *"Waiting room"*.

Use the button *"Next job"* to select the next job in the *"X-ray job list"* and start the workflow with this job.

Use the button *"Edit"* for reviewing an already accepted job. CONAXX 2 will show the area *"Image viewing"* again and the user can edit and optimize the image.

3.3.3 Working area "Administration"

This area provides functions to manage owners, patients and images. It is possible to search for owners, patients and images. Found patients and images can be edited or exported.
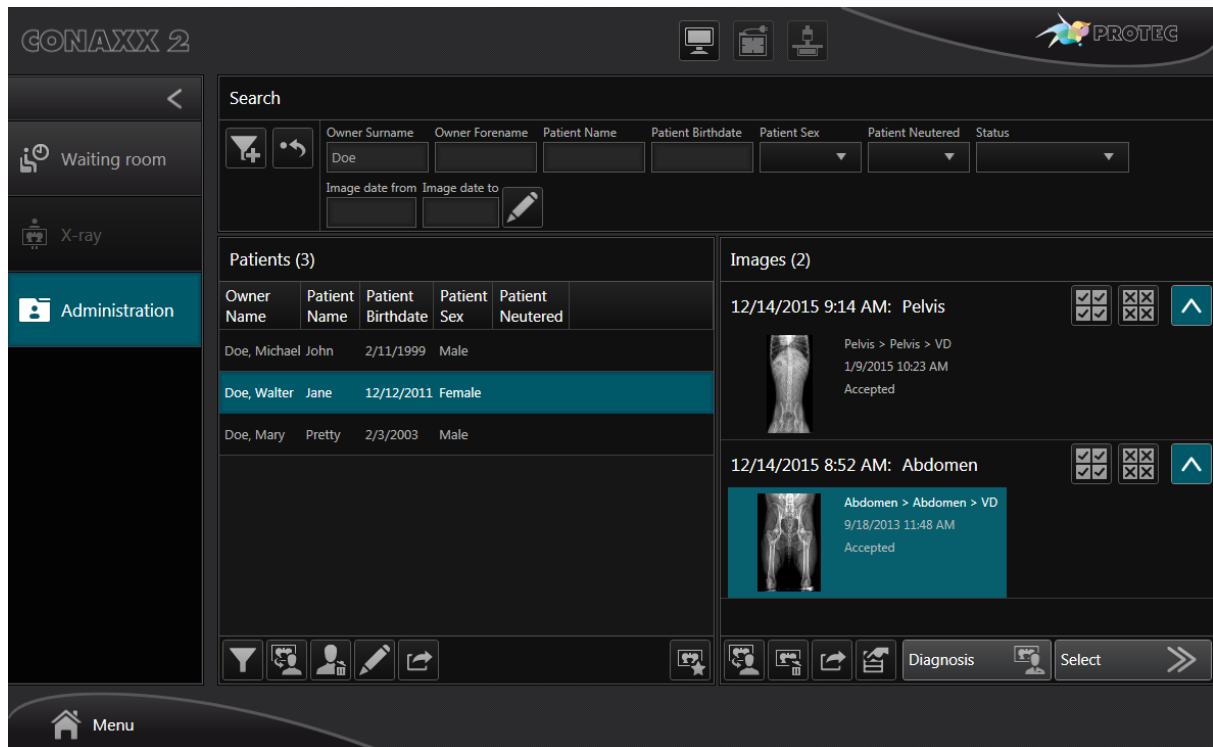
3.3.3.1 Search

The area *"Search"* provides functions to search for patients and images. It covers different search criteria. The button "↷" is used to reset search criteria and results. To add another search criteria, use the button "▼₊".

While entering search criteria the searching will be performed automatically. The search results appear in the lists *"Patients"* and *"Images"*.

3.3.3.2 Patients

The area *"Patients"* provides a list with patients. In case of entering search criteria only patients that match the search criteria are shown.

The following functions are provided:

- **Filtering:**
  Add or remove columns in the list *"Patient"*.

- **Move all images from a patient:**
  This function moves all images of a patient to another patient. It is also possible to move the patient to another owner.

  Delete patient:
  This function deletes the patient and all of his images.
  Depending on the configuration, the reject reason must be specified when deleting unaccepted images.

- **Edit:**
  Use this function to edit owner data and patient data.

- **Export:**
  This function exports all images of the selected patient. There are various export options available (see chapter "Export").

- **Create new x-ray job:**
  With this function the user can switch into the working area *"X-ray"* and create additional x-ray jobs.

3.3.3.3   Images

This area provides a list of all images of the selected patient. In case of entering search criteria only matching images are shown.

All images are grouped in studies. Use the button "∧" to collapse or expand studies. The functions *"Select all"* (⚏) and *"Deselect all"* (⚏) are available for the elements of each study. With the help of the "Ctrl" key individually selections of images are possible.

The following functions are provided for the selected image:

- **Move image:**
  This function moves the selected images to another patient.

  Delete job:
  This function deletes all selected x-ray jobs.
  Depending on the configuration, the reject reason must be specified when deleting unaccepted images.

- **Export:**
  This function exports all selected images. There are various export options available (see chapter "Export").

- **Image properties:**
  Use this function to view or edit image properties.

- **Diagnosis:**
  Use this function to switch into the *"Diagnosis"* area.

- **Select:**
  With this function the user can switch into the working area *"X-ray"*. CONAXX 2 shows a subarea according to the status of the job.

3.3.4 Area "X-ray journal"

This area represents the x-ray journal. This journal contains details of all exposed x-ray jobs including its x-ray parameters.

The *"X-ray journal"* is accessible at any time in the *"Main menu"* of CONAXX 2.

The upper area provides search functions. To reset the search criteria use the button "↰". To add another search criterion use the button "▼₊".

The list area shows all x-ray journal entries which match the entered search criteria. If no search criterion is specified, all entries will be shown in the list. The number of the entries found and their total dose area product are displayed under the result list.

The following functions are provided for the listed entries:

▼   ‑   **Filtering:**
Use this function to hide/show columns of the entry list.

💾   ‑   **Save as:**
Use this function to save the shown x-ray journal entries. CONAXX 2 supports different formats.

🖶   ‑   **Print:**
Use this function to print the shown x-ray journal entries.

3.3.4.1 Status

The field "Status" can be used to check whether the image data for an X-ray journal entry is still in CONAXX 2. If this is not the case, the field provides information about the reason why the image data is no longer available.

Status		Meaning
Available	-	The status "*Available*" means that the image data still exists in CONAXX 2.
Rejected	-	The "Rejected"*status* means that the image has not been accepted, but has been deleted. The image data is no longer available in CONAXX 2.
		The column "Reject reason" displays the reason for rejection.
		The column "Status changed on" shows the rejection date.
		The column "Status changed by" shows the user who rejected the image.
Deleted	-	The status "*Deleted*" means that an image that has already been accepted has been deleted. The image data is no longer available in CONAXX 2.
		The column "Status changed on" shows the deletion date.
		The column "Status changed by" shows the user who deleted the image.
Purged	-	The status "*Purged*" means that an image that has already been processed has been purged by CONAXX 2. The image data is no longer available in CONAXX 2.
		The column "Status changed on" shows the purging date.
		The column "Status changed by" shows „*CONAXX*".

3.3.5 Area "Diagnosis"

This area allows optimization, processing and diagnosis of an x-ray image. The area could be opened with the buttons "*Diagnosis*" (🖼) in the image viewing area and the administration.

The diagnosis area is separated into the following subareas:
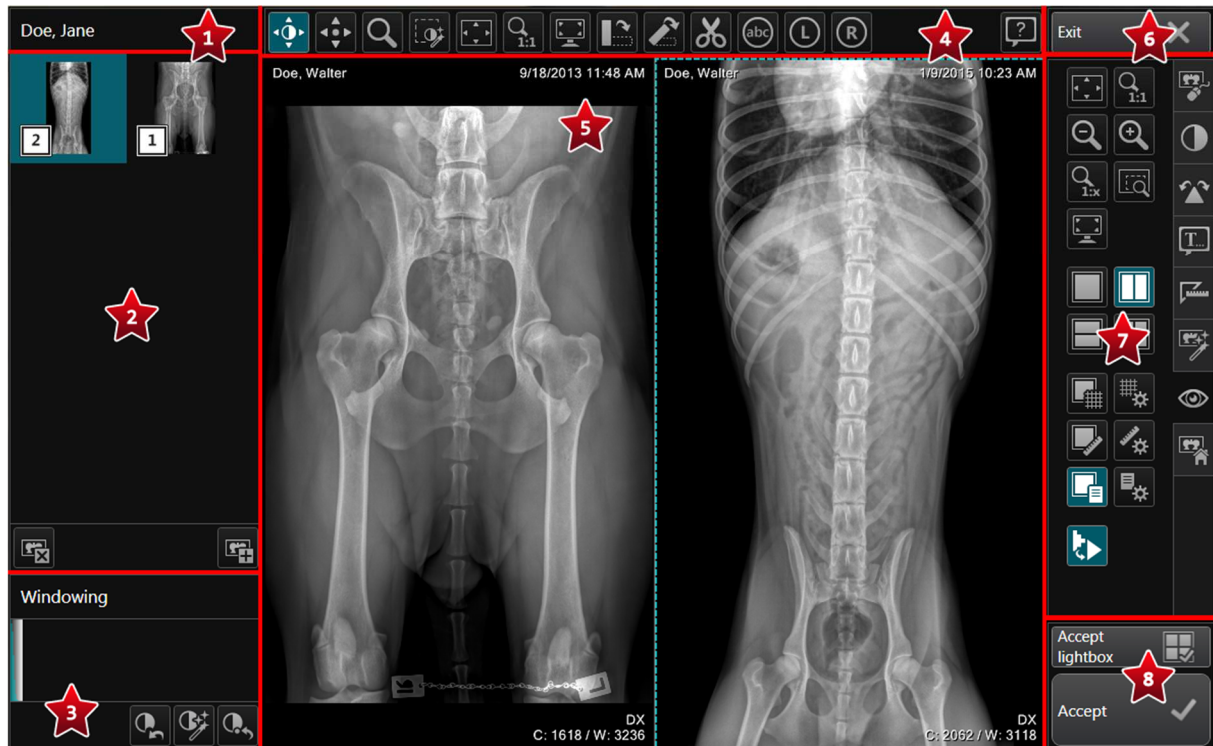
⭐1 - **Active Patient:**
The patient data of the active patient will be displayed at this position.

⭐2 - **Image bar:**
This area shows a list of images.

⭐3 - **Histogram:**
This area shows the histogram of the selected image.

⭐4 - **Quick access bar:**
In this area the main functions are accessible at any time.

Use the button "🗔" to open the quick help.

⭐5 - **Lightbox:**
In this area the open images will be shown. For simultaneous display of multiple images, the light box can be subdivided into up to four subareas (tiles).

⭐6 - **Exit:**
Closes the "Diagnosis" window.

⭐7 - **Functions:**
This area provides different functions to optimize and edit the images.

Accept:
- Images can be accepted in this area. The button "Accept" accepts the selected image in the lightbox. The button "Accept lightbox" accepts all images in the lightbox.

3.3.5.1   Image bar

When opening images, they appear first as a small preview image in the image bar. If an image is shown in a tile of the lightbox the number of the tile is displayed in the left lower corner of the preview image.

By clicking on a preview image in the image bar, a context menu opens. Here, a tile can be selected in which the image will be loaded. If you don't want to load the image you can close the context menu by clicking the button "*Cancel*". When only on tile is set, the image will be loaded automatically without showing the context menu.

An image can be removed from the image bar by selecting the image in the image bar and clicking the button *"Close image"* (▦).

One or more images can be added to the image bar by clicking the button *"Open image"* (▦). A new dialog appears in which all images of the active patient will be shown. By clicking on the preview images you can select or deselect the images. You can also use the buttons *"Today"*, *"Select all"* (▦) und *"Deselect all"* (▦). Confirm the selection with the button *"OK"*.

If you want to add images of another patient to the image bar, the "*Open image of another patient*" (👤) button must be pressed. This opens a patient selection dialog that can be used to search for a patient. By selecting a patient in the search results list and then pressing the "*OK*" *button*, you will be taken to the open images dialog. Here, one or more images can be selected as described in the previous paragraph.

3.3.5.2   Histogram

The histogram shows the greyscale distribution of the selected image in the lightbox. As well as displaying, the histogram area also enables the interactive modification of the window values, the greyscale threshold values, in which the image should be displayed. This function corresponds to the "*Windowing*" function. Additionally the functions "*Reset windowing*" (🔧), "*Automatic windowing*" (🔧) and "*Full windowing*" (🔧) are available.

3.3.5.3   Functions

The functions are divided into categories. An overview of the available keyboard shortcuts for the functions can be found in Appendix 1. The following categories and functions are available:

Category tools:

- **Tool "windowing":**
  This tool allows the adjustment of the windowing (brightness and contrast) by moving the mouse around with a pressed mouse button.

- **Tool "Move image" (Panning):**
  If the image is larger than the predefined tile or if it has been enlarged by zooming, you can move it within the tile where it is loaded, by pressing and holding the left mouse button.

- **Tool "magnifier":**
  This tool activates the magnifier. The magnifier follows the mouse pointer. By clicking the button again, the tool will be deactivated.

- **Settings "magnifier":**
  The magnifier size and the magnifier factor can be configured here.

- **Tool "Region windowing":**
  Other than the standard windowing function, where the window leveling is applied immediately to the whole image, the user of the region windowing function defines an

area (region) of the image where contrast is optimized first. The settings of this area are later applied to the complete image. If the tool is active a rectangle which defines the region will be shown if you click and hold the left mouse button. If you click the button "*Region windowing*" again the region windowing tool will be deactivated.

- **Settings "Region windowing":**
  The size of the rectangle can be configured here.

Category windowing:

- **Full windowing:**
  Resets the windowing and show all gray values of the image.

- **Automatic windowing:**
  Fits the windowing optimally to the image content.

- **Reset windowing:**
  Resets the windowing values to the values stored in the database.

Category rotate/mirror:

- **Cropping:**
  Crops the image according to a user-defined cropping frame.

- **Electronic shutter:**
  The electronic shutter is applied by a user-defined frame. Outside the frame the image will be displayed black.

- **Rotate left 90°:**
  Rotates the image 90° counterclockwise.

- **Rotate right 90°:**
  Rotates the image 90° clockwise.

- **Free rotation:**
  Rotates the image according to a user defined alignment line.

- **Flip horizontal:**
  Flips the image along the vertical axis.

- **Flip vertical:**
  Flips the image along the horizontal axis.

Category annotations:

- **Annotation "text":**
  Inserts a text annotation at a user defined position into the image. The user can choose between predefines texts or enter an own text.

- **Annotation "laterality marker left":**
  Inserts the annotation "laterality marker left" at a user defined position into the image.

- **Annotation "laterality marker right":**
  Inserts the annotation "laterality marker right" at a user defined position into the image.

- **Annotation "arrow":**
Hold down the left mouse button and drag the mouse pointer over to image to draw an arrow.

- **Annotation "ellipse":**
Hold down the left mouse button and drag the mouse pointer over to image to draw an ellipse.

- **Annotation "rectangle":**
Hold down the left mouse button and drag the mouse pointer over to image to draw a rectangle.

- **Annotation "freehand":**
Hold down the left mouse button and drag the mouse pointer over to image to draw a freehand annotation.

- **Color of the annotation:**
Use this function to select the color of the annotation.

- **Line width of the annotation:**
Use this function to select the line width of the annotation.

- **Select all annotations:**
Selects all annotations which are placed in the image.

- **Deselect all annotations:**
Deselects all annotations which are placed in the image.

- **Delete selection:**
Deletes all selected annotations in the image.

- **Delete all annotations:**
Deletes all annotations.

- **Undo:**
With this function you can revoke a step.

- **Redo:**
With this function you can repeat a step.

Category measuring:

- **Distance:**
Mark the start point of the distance with a left click. The next mouse click defines the end point of the distance.

- **Angle:**
Mark the start point of the first axis with a left click. Then mark the point of the angle with a second click and finally mark the end point of the second axis with a third click.

- **Circle measurement:**
Define the center of the circle with a left click. The next mouse click defines the radius of the circle. Finally, the diameter will be displayed.

- **Angle between two lines:**
Mark the start point of the first line with a left click. The next mouse click defines the end point of the first line. Now, the start point and end point of the second line can be drawn in the same way.

- **PennHIP measurement:**
Define the center of the circle for the first angle with a left click. The next mouse click defines the radius of the circle. Now, the circle for the second angle can be drawn in the same way. Finally, the distraction index (DI = d/r, with d = distance between the center of the femoral head and the center of the acetabulum, r = radius of the femoral head) will be displayed.

- **HD angle:**
Define the center of the circle for the first angle with a left click. The next mouse click defines the radius of the circle. Now, the circle for the second angle can be drawn in the same way. The last click defines the direction of the angle.

- **Cardiothoracic ration:**
Mark the start point of the first line (heart) with a left click. The next mouse click defines the end point of the first line (heart). Now, the start point and end point of the second line (thorax) can be drawn in the same way.

- **Vertebral Heart Score (VHS):**
This function allows the measuring of the vertebral heart score (VHS). This is done in a series of steps. After selecting the tool, the mouse pointer changes to a cross with a line, a heart, a "1" and a "L". Now you have to define the starting point of the first line (longitudinal axis measurement). This is done by making a left click on a position in the image. The next mouse click defines the end point of the first line (longitudinal axis measurement). Once the first line is defined, the mouse pointer changes to a cross with a line, a heart, a "1" and a "S". Now, the second line (short axis measurement) can be drawn in the same way. Once the second line is defined, the mouse pointer changes to a cross with a line, a heart, a "1" and a "T". Now, the reference point must be marked on the spine (T4). The direction can be defined with the next click. Once the last action has been carried out, the longitudinal axis measurement and the short axis measurement will be drawn automatically on the reference point T4. Also a label "VHS = " will be displayed. By clicking on the edit icon (✎) an input window appears. Count the number of vertebrae that fall within the caliper points and enter the number in the field "L". The "S" (short axis measurement) value and the sum ("VHS") will be calculated automatically. To enter the result of the short axis measurement manually the option "*Manual input*" must be activated. The additional window will be closed by clicking on the "*OK*" button.

- **Tibial Plateau Angle (TPA):**
This function allows the measuring of the tibial plateau angle (TPA). This is done in a series of steps. After selecting the tool, the mouse pointer changes to a cross with a line and a "1". Now you have to define the starting point of the first line (tibial plane - right point). This is done by making a left click on a position in the image. The next mouse click defines the end point of the first line (tibial plane - left point). Once the first line is defined, the mouse pointer changes to a cross with a line and a "2". Now, the second line (axis from top to bottom) can be drawn in the same way. Once the last action has been carried out, the angle can be read off.

Vertebral Left Atrial Size measurement (VLAS):
A Vertebral Left Atrial Size measurement can be selected and placed above the image using the mouse. This function can be used to calculate a Vertebral Left Atrial Size (VLAS). This measurement is applied in several steps. After selecting the tool, the mouse pointer changes to a cross with a line, a "1" and a "V". Now you have to determine the starting point of the first line (bifurcation of the trachea). This is done by a left mouse button click on a position in the image. With the next mouse click you define the end point of the first line (point at which the caudal edge of the left atrium crosses the dorsal boundary of the vena cava caudalis). As soon as the first line is completed, the mouse pointer changes into a cross with a line, a "1" and a "T". Now the reference point on the spine must be marked (T4). With a second click, the direction can be defined. If the last action has been performed, the first line is automatically drawn to the reference

point T4 and a label "VLAS" is displayed. By clicking on the edit icon (✎) an input window appears. Count the number of vertebrae along the line and enter the value in the input field. This value corresponds to the VLAS value. The additional window will be closed by clicking on the "*OK*" button.

Radiographic Left Atrial Dimension (RLAD):
An RLAD measurement can be selected and placed above the image using the mouse. This function can be used to calculate the Radiographic Left Atrial Dimension (RLAD). This measurement is applied in several steps. After selecting the tool, the mouse pointer changes to a cross with a line, a heart, a "1" and an "L". Now you have to define the starting point of the first line (longitudinal axis measurement). This is done by a left mouse button click on a position in the image. With the next mouse click you define the end point of the first line (longitudinal axis measurement). As soon as the first line is completed, the mouse pointer changes into a cross with a line, a heart, a "1" and an "S". Now, the second line (short axis measurement) can be drawn in the same way. As soon as the second line is completed, the mouse pointer changes to a cross with a line, a "1" and an "R". Now another point is defined at the dorsal edge of the left atrium. If this point is drawn, the mouse pointer changes into a cross with a line, a heart, a "1" and a "T". Now, the reference point must be marked on the spine (T4). The direction can be defined with the next click. Once the last action has been carried out, the longitudinal axis measurement, the short axis measurement and the additional line (R) will be drawn automatically on the reference point T4. Also a label "VHS | RLAD" will be displayed. By clicking on the edit icon (✎) an input window appears. Count the number of vertebrae that fall within the caliper points and enter the number in the field "L". The "S" (short axis measurement) value, the sum ("VHS") and the RLAD value will be calculated automatically. To enter the result of the short axis measurement and the RLAD value manually the option "*Manual input*" must be activated. The additional window will be closed by clicking on the "*OK*" button.

Tibial Tuberoses Advancement (TTA):
A Tibial Tuberoses Advancement measurement can be selected and placed at a location above the image using the mouse. This function can be used to calculate the Tibial Tuberoses Advancement measurement (TTA). This measurement is applied in several steps. After selecting the tool, the mouse pointer changes to a cross with a circle and a "1". Now you have to determine the center of the first circle. This is done by a left mouse button click on a position in the image. With the next mouse click you define the radius of the circle. Once the first circle is complete, the mouse pointer changes to a cross with a circle and a "2". Now the second circle can be drawn in the same way. As soon as the second circle is completed, the mouse pointer changes to a cross with a "P". With a mouse click, the tip of the patella is defined. Then the mouse pointer changes to a cross with a "T". With one mouse click, the point at the tibial tuberosity is defined. If the last action has been performed, the TTA can be read. After finishing the drawing, it is possible to readjust the individual components of the TTA measurement.

- **Settings measurement:**
Here the unit can be configured. You are also able to run a manual calibration based on a reference distance in the image. An input dialog appears, where the unit (mm, cm, inch) and the length that is to be defined can be selected. After confirming with the "*OK*" button, the mouse pointer changes to a drawing tool for the distance measurement, which is used to describe the corresponding distance in the image.

- **Color of the annotation:**
Use this function to select the color of the annotation.

- **Line width of the annotation:**
Use this function to select the line width of the annotation.

- **Select all annotations:**
Selects all annotations which are placed in the image.

- **Deselect all annotations:**
  Deselects all annotations which are placed in the image.

- **Delete selection:**
  Deletes all selected annotations in the image.

- **Delete all annotations:**
  Deletes all annotations.

- **Undo:**
  With this function you can revoke a step.

- **Redo:**
  With this function you can repeat a step.

Category filter:

- **AIP Filter soft:**
  Provides image optimizations through intelligent filter functions.

- **AIP Filter medium:**
  Provides image optimizations through intelligent filter functions.

- **AIP Filter strong:**
  Provides image optimizations through intelligent filter functions.

- **AIP Filter ultra:**
  Provides image optimizations through intelligent filter functions.

- **AIP Fallback filter:**
  Allows the use of fallback filter, if the AIP filters do not provide a satisfying result.

- **Professional Image Tuning:**
  Allows the use of the individually generated image optimization parameters.

- **Change default AIP Filter:**
  Use this button to use the current filter for future jobs with the same organ (e.g., Human > Head > Skull > AP).

- **Professional Image Tuner:**
  Opens a window where the user can adjust the image optimization parameters.

- **Filter 1:**
  Provides image optimizations through filter functions.

- **Filter 2:**
  Provides image optimizations through filter functions.

- **Filter 3:**
  Provides image optimizations through filter functions.

- **Filter 4:**
  Provides image optimizations through filter functions.

- **Filter 5:**
  Provides image optimizations through filter functions.

- **Filter 6:**
  Provides image optimizations through filter functions.

- **Filter 7:**
  Provides image optimizations through filter functions.

- **Filter 8:**
  Provides image optimizations through filter functions.

- **Grid line suppression:**
  Activates the automatic grid line suppression.

- **Invert:**
  Inverts the grey scale values of the image.

Category viewing:

- **Fit to screen:**
  The image is modified to the size of the tile.

- **Zoom 1:1:**
  The image is shown in a 1:1 ratio, i.e., one pixel in the image corresponds to one pixel on the screen.

- **Zoom out:**
  The image will be scaled down.

- **Zoom in:**
  The image will be scaled up.

- **Zoom factor:**
  The image will be enlarged or reduced to the selected factor.

- **Zoom region:**
  By pressing and holding the left button on the mouse, you can pull a rectangle over the area that should be enlarged. When you release the mouse button, the selected area of the image is shown enlarged.

- **Full screen:**
  The image is shown as a full screen image. You can return to normal view with a double-click or by pressing the "ESC" key.

- **Equalize zoom:**
  The zoom level of all images loaded in the tiles will be adjusted to the zoom level of the selected tile.

- **Tiling 1, 1:**
  Sets the tiling to 1x1.

- **Tiling 2, 1:**
  Sets the tiling to 2x1

- **Tiling 1, 2:**
  Sets the tiling to 1x2.

- **Tiling 2, 2:**
  Sets the tiling to 2x2.

- **Show grid:**
  If the button is active a grid will be shown.

- **Settings grid:**
  The color, the unit and the scale of the grid can be configured here.

- **Show ruler:**
  If the button is active a ruler will be shown.

- **Settings ruler:**
  The position, color and unit of the ruler can be configured here.

- **Show overlays:**
  If the button is active overlays will be shown.

- **Settings overlays:**
  The color of the overlays can be configured here.

- **Interpolation:**
  Activates and deactivates the interpolation of the image display.

Category global:

- **Image properties:**
  Edit image properties, e.g., image comment or image keyword.

- **Reset changes:**
  Resets all changes which were made by the user.

- **Raw image:**
  Resets all changes in the image. Also, automatic optimizations of CONAXX 2 while importing the image from the modality.

- **New job:**
  Use this function to create new x-ray jobs.

- **Repeat exposure:**
  Use this function to duplicate the selected job. This is useful to repeat exposures.

- **Delete job:**
  This function deletes the selected x-ray job. Depending on the configuration, the reject reason must be specified when deleting.

Category export:

- **Print (DICOM):**
  The DICOM print layouter will be activated and shown in the lightbox. See chapter "DICOM print layouter in the lightbox".

- **Print:**
  Prints the x-ray image on a Windows printer.

- **Save as:**
  Saves the x-ray image in different image formats (DICOM, DICOM (anonymized), Bitmap, JPEG, PNG, TIFF) to hard disks or mobile media.

- **Send (E-mail):**
  Send the x-ray image as an e-mail attachment. The default e-mail client of the operating system will be used for this function.

- **Send (DICOM):**
  Send the x-ray image via DICOM Store to an external PACS.

To finish the editing the button *"Accept"* can be used. Afterwards CONAXX 2 select the next not yet accepted x-ray job from the image bar.

3.3.5.4 DICOM print layouter in the lightbox

The layout will be created in this area. The following functions are available:

DICOM printer:
Selection of the DICOM printer if more than one DICOM printer is configured.

Film size:
List of all configured film sizes.

Orientation:
Select "*Portrait*" or "*Landscape*".

Type:
No selection possible. "STANDARD" is always used.

Format:
Select „*1,1*", „*1,2*", „*2,1*" or „*2,2*".

-    **Print (DICOM):**
     The image will be printed on a DICOM printer.

-    **Close:**
     The DICOM print-layouter will be closed.

3.3.6 Area "DICOM Print"

If the user adds an x-ray image to the DICOM Print layout, an additional button ("*DICOM Print*") will appear in the navigation area (see chapter "User interface"). To open the DICOM Print layout area click on this button.

The DICOM Print layout area is separated into the following subareas:
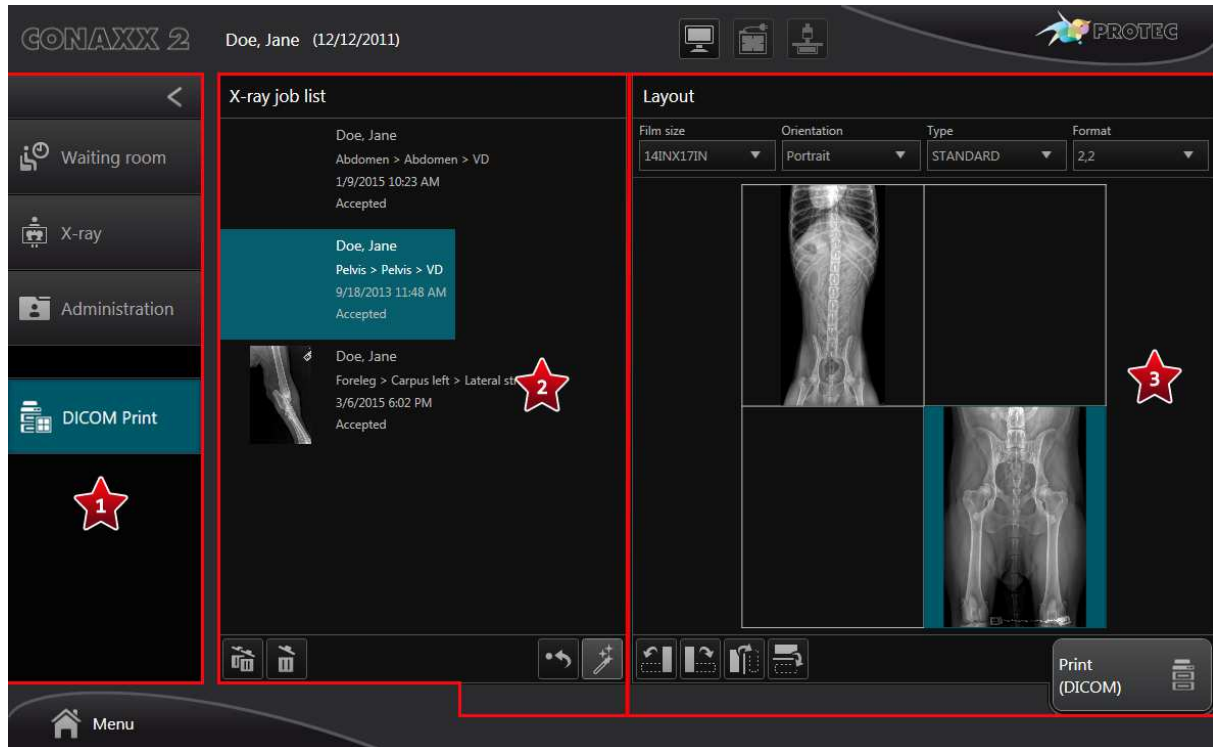
Navigation area:
- In the navigation area an additional button "*DICOM Print*" will appear if the user adds an x-ray image to the DICOM Print layout.

X-ray job list:
- This area shows a list of images.

Layout area:
- This area shows the layout.

3.3.6.1   X-ray job list

All x-ray jobs added to the DICOM Print layout image list will appear in this area. The following functions are provided:

- **Delete all:**
  Removes all images from the DICOM Print layout image list. The DICOM Print layout area will be closed automatically.

- **Delete selected:**
  Removes the selected image from the DICOM Print layout image list.

- **Reset:**
  Removes all images from the layout.

- **Generate automatically:**
  Fill the layout with images automatically.

The list in this area is cleared after the print is completed or when you change the active patient.

3.3.6.2   Layout area

A layout can be created here. The following functions are provided:

DICOM printer:
Selection of the DICOM printer if more than one DICOM printer is configured.

Film size:
List of all configured film sizes.

Orientation:
Select "*Portrait*" or "*Landscape*".

Type:
Select the type of the layout.

Format:
List of all configured formats for the selected "*Type*".

- **Rotate left 90°:**
  Rotates the selected image 90° counterclockwise.

- **Rotate right 90°:**
  Rotates the selected image 90° clockwise.

- **Flip horizontal:**
  Flips the selected image along the vertical axis.

- **Flip vertical:**
  Flips the selected image along the horizontal axis.

The user can fill the layout with images by using drag and drop function. Click on an image in the x-ray job list and hold down the left mouse button. Drag the mouse pointer over a tile in the layout. To remove an image from a layout tile click on an image in the layout tile and hold down the left mouse button. Drag the mouse pointer to the x-ray job list.

If the layout is ready click the button "*Print (DICOM)*". Afterwards a window will appear in which you can make additional print settings. Click "*Print*" to send the print job to the DICOM printer.

3.3.7　Area "Professional Image Tuner"

This area provides allows the individual adjustment of the image optimization parameters. The area could be opened with the button "*Professional Image Tuner*" (⚏) in the image viewing area and the in the diagnostic window.

The Professional Image Tuner area is separated into the following subareas:
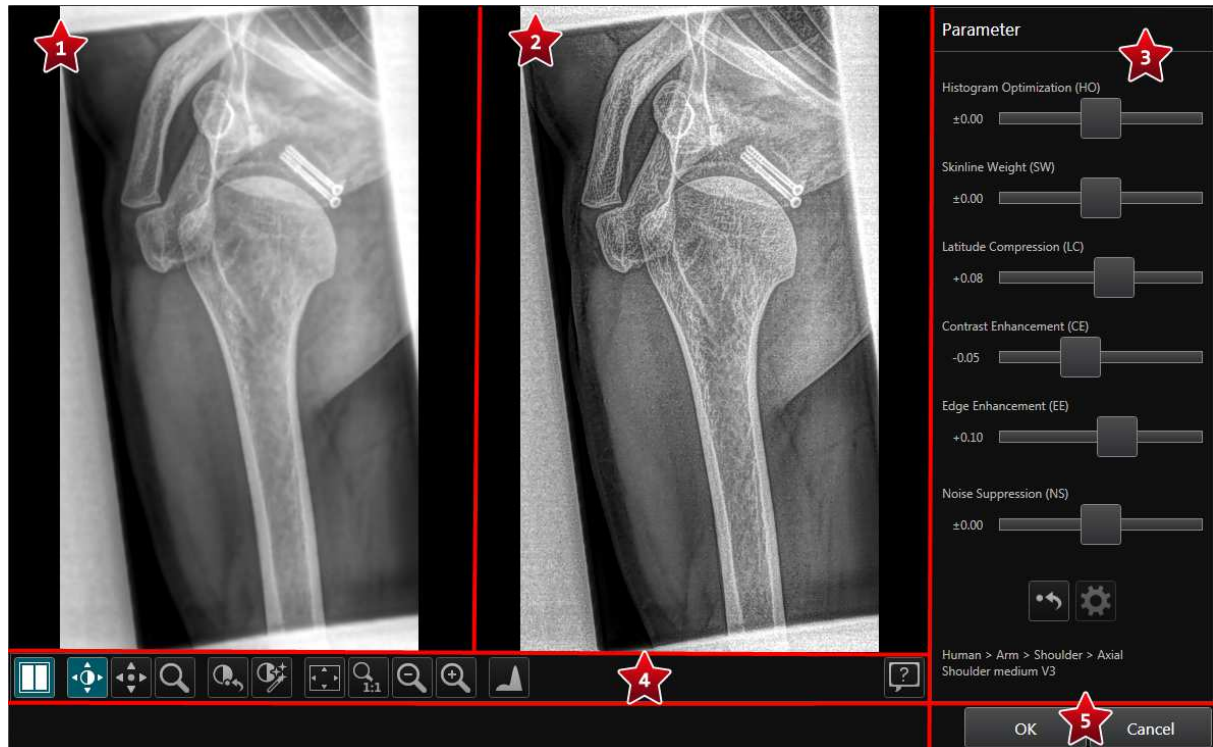
		Original image:
★1	-	This area shows the original image. It is for comparison with the working image.
★2	-	**Working image:** This area shows the working image on which the current applied parameter settings are visualized.
★3	-	**Parameter:** In this area the parameters can be changed.
★4	-	**Functions:** This area provided different viewing functions.
★5	-	**OK and Cancel:** "*OK*" saves the currently applied parameter settings for this image. At the same time, the "*Professional Image Tuner*" window will be closed. "*Cancel*" will close the "*Professional Image Tuner*" window without applying the current parameter settings.

3.3.7.1   Parameter

There are six parameters available which can be adjusted by sliders. The sliders can be changed with the left mouse button or the keyboard (arrow keys, pos 1, end, picture up, picture down). Next to each slider, a label indicated the currently applied value. Double-clicking on the label resets the value to "0.00".

Depending on the used modality, either parameter set 1 or parameter set 2 is available.

Parameter set 1:

HO
- **Histogram Optimization:**
  Controls the visualization of the image, with respect to available grayscale levels and type of tissue to display.

SW
- **Skinline Weight:**
  Controls how much of the soft tissue towards the skin line that is visualized in the image.

LC
- **Latitude Compression:**
  Controls the ability to visualize both translucent and dense areas simultaneously.

CE
- **Contrast Enhancement:**
  Controls the local contrast of medium and large objects and the strength of vague structures.

EE
- **Edge Enhancement:**
  Controls the sharpness of finer structures, such as trabecular structures for bones.

NS
- **Noise Suppression:**
  Controls the suppression of unstructured noise, often apparent in soft tissues or dense areas.

- **Reset:**
  All parameters values will be set to "0.00".

- **Reset to default settings:**
  If parameters are stored in the configuration, they can be loaded here.

Parameter set 2:

GB
- **Global Brightness:**
  This parameter controls the overall brightness of the depicted object.

GC
- **Global Contrast:**
  This parameter controls the overall image contrast.

LC
- **Latitude Compression:**
  This parameter controls the ability to visualize both translucent and dense areas simultaneously.

NR
- **Noise Reduction:**
  This parameter controls the suppression of unstructured noise, often apparent in soft tissues or dense areas.

SE
- **Small structure Enhancement:**
  This parameter controls the sharpness of finer structures, such as trabecular structures for bones.

- **Reset:**
  All parameters values will be set to "0.00".

- **Reset to default settings:**
  If parameters are stored in the configuration, they can be loaded here.

3.3.7.2   Functions

The following functions are available:

Original image:

- **Show/Hide original image:**
  The original image can be displayed or hidden.

Tools:

- **Tool "Windowing":**
  This tool allows the adjustment of the windowing (brightness and contrast) by moving the mouse around with a pressed mouse button.

- **Tool "Move image" (Panning):**
  If the image is larger than the predefined tile or if it has been enlarged by zooming, you can move it within the tile where it is loaded, by pressing and holding the left mouse button.

- **Tool "Magnifier":**
  This tool activates the magnifier. The magnifier follows the mouse pointer. By clicking the button again the tool will be deactivated.

Windowing:

- **Full windowing:**
  Resets the windowing and show all gray values of the image.

- **Automatic windowing:**
  Fits the windowing optimally to the image content.

Viewing:

- **Fit to screen:**
  The image is modified to the size of the tile.

- **Zoom 1:1:**
  The image is shown in a 1:1 ratio, i.e., one pixel in the image corresponds to one pixel on the screen.

- **Zoom out:**
  The image will be scaled down.

- **Zoom in:**
  The image will be scaled up.

Viewing:

- **Show histogram:**
A histogram will be displayed in the image.

Quick help:

- **Quick help:**
Opens the quick help

3.3.7.3   Set parameter values as default

The applied parameter values can be stored in the configuration as default for this type of exposure (e.g., human > head > skull > ap). As a result, these parameter values will be executed automatically on new exposures of this type.

The "*Professional Image Tuner*" window was called from the image viewing area:

- Save the currently applied parameter values by clicking the "*OK*" button in the "*Professional Image Tuner*". The "*Professional Image Tuner*" window will close automatically and you are back in the image viewing area.

- Click on the button "*AIP*" (🪄) to call the context menu of AIP.

- In the context menu, click on the entry "*Set current as default*" (🖳🪄).

- If there are other view positions of the current fine part selection using the same AIP filter, a selection window appears. In this window the current view position is preselected. You can apply the changes to other view positions by activating the respective line. Confirm your selection with the "*OK*" button. The selection window will be closed and an additional window appears.

- Enter your name in the input field. The modification date and the name of the person who set the current as default will be visualized in the configuration.

- Confirm with the "*OK*" button. The window closes automatically.

- As soon as the storage has been carried out, an information window will appear which you can confirm with the "*OK*" button.

The "*Professional Image Tuner*" window was called from the diagnostic window:

- Save the currently applied parameter values by clicking the "*OK*" button in the "*Professional Image Tuner*". The "*Professional Image Tuner*" window will close automatically and you are back in the diagnostic window.

- Click on the button "*Set current as default*" (🖳🪄) in the category filter.

- If there are other view positions of the current fine part selection using the same AIP filter, a selection window appears. In this window the current view position is preselected. You can apply the changes to other view positions by activating the respective line. Confirm your selection with the "*OK*" button. The selection window will be closed and an additional window appears.

- Enter your name in the input field. The modification date and the name of the person who set the current as default will be visualized in the configuration.

- Confirm with the "*OK*" button. The window closes automatically.

- As soon as the storage has been carried out, an information window will appear which you can confirm with the "*OK*" button.

3.4　Exposure index

The exposure index is a measure of the detector response to radiation in the relevant image region of an image acquired with a digital x-ray imaging system. It will be calculated automatically while creating an image. The exposure index allows the user to judge if an image was taken at a detector exposure level suitable for the intended level of image quality.

"The exposure index also has limitations. It is important to understand these to avoid misinterpretation and misuse of exposure index values. This is particularly true if exposure index values from different digital x-ray imaging systems or for images acquired with significantly different technical factors are to be compared" [IEC 62494-1]

"With otherwise identical technical factors (kV, filtration, SID, grid) and subject, the exposure index of a particular digital x-ray imaging systems is linearly proportional to the image receptor air kerma. For example, doubling the mAs will result in a doubling of the exposure index." [IEC 62494-1]

3.4.1　Exposure index overlays

The following overlays with information regarding the exposure index can be configured:

EI － **Exposure Index:**
Measure of the detector response to radiation in the relevant image region of an image acquired with a digital x-ray imaging system.

EI-T － **Target Exposure Index:**
Expected value of the exposure index when exposing the x-ray image receptor properly.

DI － **Deviation Index:**
Number quantifying the deviation of the actual exposure index from a target exposure index.

3.4.2　Interpretation of the exposure index values

The user should verify with each exposure the deviation index. Based on the value of the deviation index the user should decide whether a dose reduction is necessary for this kind of x-ray job (e.g., Head > Skull > AP). We recommend the following interpretation of the deviation index:

Green area － The deviation index is between **-2** and **+2**

Yellow area － The deviation index is between **-5** and **-2** or between **+2** and **+5**

Red area － The deviation index is less than **-5** or greater than **+5**

If the deviation index is a part of the yellow or red area, the user should check the exposure index mask (see the following chapter). If the deviation index is still in the yellow or red area and if it is positive (e.g., +5.2), so this is an indication that the dose can be reduced for this kind of x-ray job without losing image quality elementary. If necessary, please contact your dealer.

In principle, negative values are negligible if the image quality is diagnostically satisfactory.

3.4.3 Drawing the exposure index mask

3.4.3.1 Exposure index window user interface

The user interface of the exposure index window is subdivided into several sections:
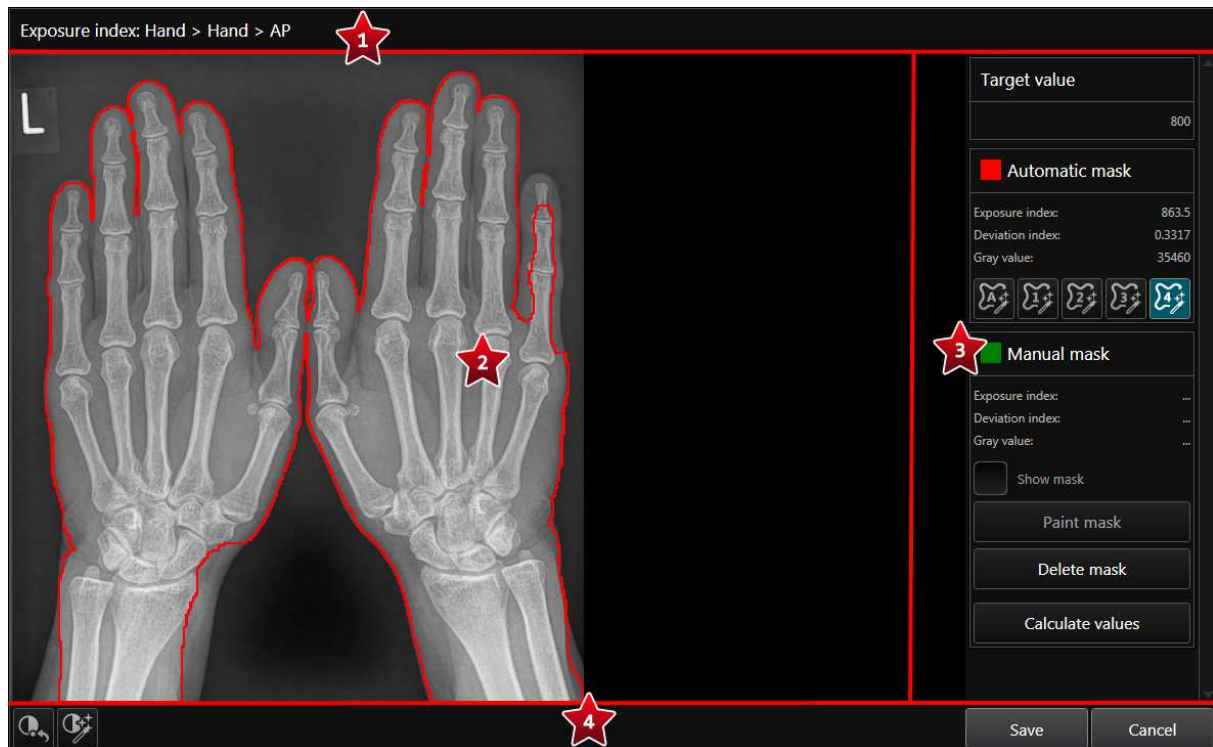
	-	**Active x-ray job:** Displays the description of the current active x-ray job.
	-	**Area "Raw image":** In this area the raw image of the active x-ray job will be displayed.
	-	**Mask functions:** This area provides various functions for the creation of the exposure index mask. See below.
	-	**Global functions:** This area provides global functions. The button "*Cancel*" discards all changes and closes the window. The "*Save*" button saves the changes in the exposure index mask and closes the window. The button "🔍" resets the windowing and show all gray values of the image. The button "🪄" fits the windowing optimally to the image content.

Mask function: target value

This area provides the target value for the active x-ray job.

Mask function: Automatic mask

This area provides information and functions for the automatic mask. Automatic mask is being displayed always in the color "red".

Exposure index	-	Displays the exposure index value of the current applied automatic mask.
Deviation index	-	Displays the deviation index value of the current applied automatic mask.
Gray value	-	Displays the gray value of the current applied automatic mask.

Depending on the selected modality, the following functions are available:

- **Current saved automatic mask:**
  Shows the current saved automatic mask. At the same time the current saved values for the exposure index, deviation index and gray value will be displayed.

- **Automatic mask 1:**
  Calculates the automatic mask based on deposited filter. The values for the exposure index, deviation index and gray value will be calculated.

- **Automatic mask 2:**
  Calculates the automatic mask based on deposited filter. The values for the exposure index, deviation index and gray value will be calculated.

- **Automatic mask 3:**
  Calculates the automatic mask based on deposited filter. The values for the exposure index, deviation index and gray value will be calculated.

- **Automatic mask 4:**
  Calculates the automatic mask based on deposited filter. The values for the exposure index, deviation index and gray value will be calculated.

Mask function: Manual mask

This area provides information and functions for the manual masks. The manual mask is being displayed always in the color "green".

Exposure index	-	Displays the exposure index value of the current drawn manual mask
Deviation index	-	Displays the deviation index value of the current drawn manual mask
Gray value	-	Displays the gray value of the current drawn manual mask
Show mask	-	Shows the manual mask.
Paint mask	-	Activate or deactivate the drawing mode of the manual mask.
Delete mask	-	Deletes the current manual mask.
Calculate values	-	Calculates the values for exposure index, deviation index and gray value for the current drawn manual mask.

3.4.3.2   Drawing exposure index mask procedure

The recommended procedure for drawing the exposure index mask is described below. The mask should be drawn in this way that the relevant image area is covered. The relevant image area is the examination-specific sub-area or sub-areas of the image containing the diagnostically relevant information. [IEC 62494-1]

- Step 1:
  While opening the exposure index mask window the application tries to load the current stored automatic exposure index mask. If an automatic mask exists, it will be displayed on the raw image (red mask). At the same time the button ⌗ is active. Check whether the drawn mask covers the relevant image area. In this case the calculated exposure index values are correct and you can close the exposure index mask window by clicking the button "*Cancel*". Otherwise continue with the step 2.
  If there is no stored automatic exposure index mask, no mask will be displayed on the raw image and the button ⌗ is disabled. Continue with the step 2.

- Step 2:
  Try the automatic masks 1 to 4 (⌗, ⌗, ⌗, ⌗). At each mask check whether the drawn mask covers the relevant image area. In this case save the new calculated exposure index values by clicking the button "*Save*". A question dialog will appear. Please select the entry "*Save automatic mask values*". The dialog and the exposure index mask window will be closed automatically.
  If none of the automatic masks covers the relevant image area, please continue with step 3.

- Step 3:
  Draw a manual mask that covers the relevant image area optimally. Therefore click on the button "*Paint mask*". If the function "*Paint mask*" is active the mouse cursor will change if you move to the raw image. Find a starting point of the relevant image area and click with the left mouse button. A green square is drawn in the raw image. Move the mouse to another point along the relevant image area. Make sure that a straight line can be drawn between the current mouse position and the previously drawn green square. A second green square can be drawn by using the left mouse button. The two green squares will be connected by a green line automatically. Repeat that process until you have enclosed the relevant image area. A dashed green line will be drawn from the last green square to the first green square. The enclosed area is easily recognizable by a green coloration. Once you have finished the mask click on the button "*Calculate values*". Click on the button "*Save*". A question dialog will appear. Please select the entry "*Save manual mask values*". The dialog and the exposure index mask window will be closed automatically.
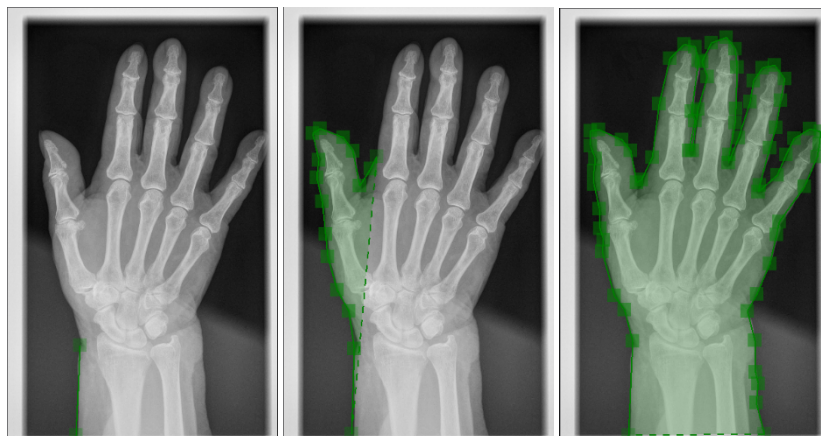
4　Configuration

In the configuration the user can configure CONAXX 2. The configuration is always accessible in the *"Main menu"* of CONAXX 2.
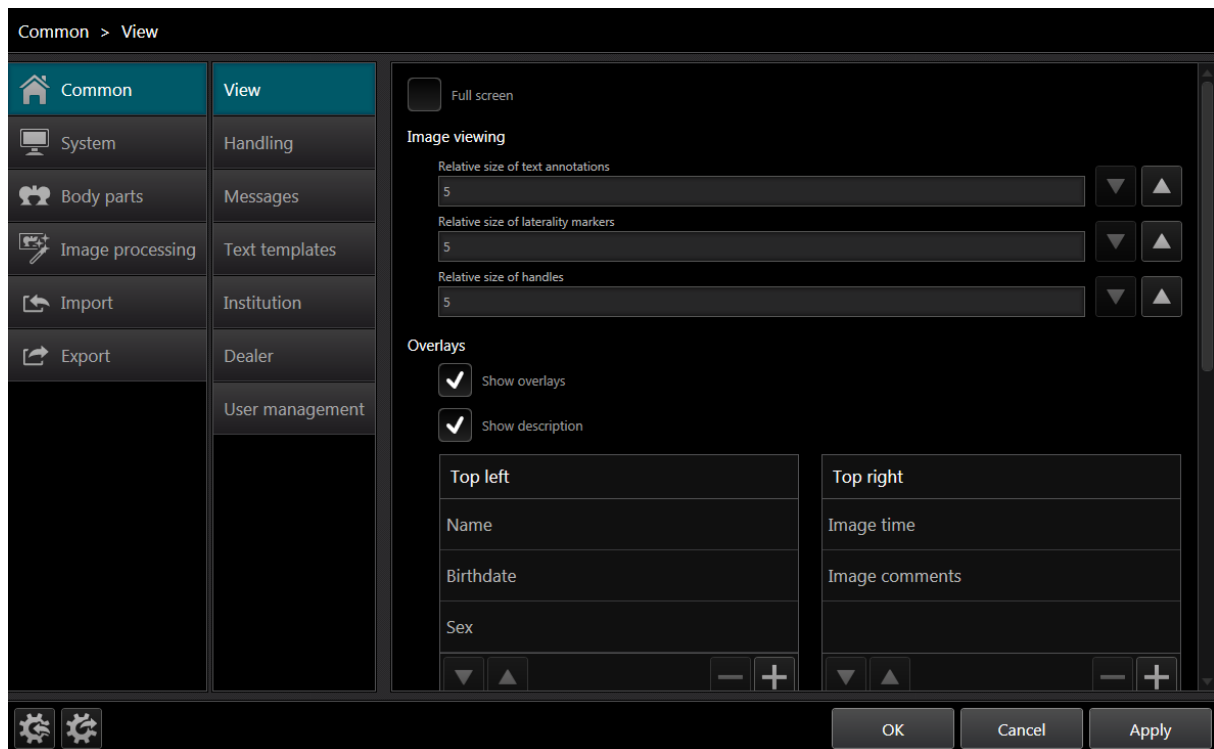
The user interface of the configuration is separated in the following areas:
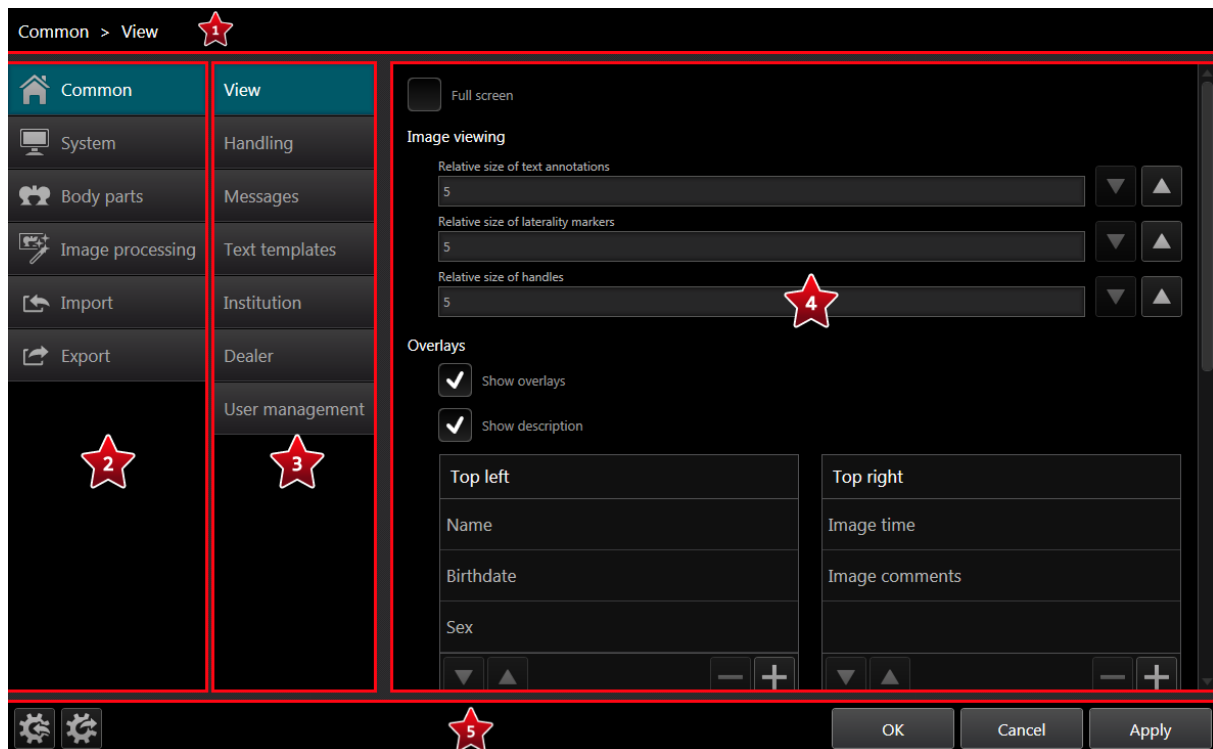
⭐1	-	**Current section:** Shows the currently active section.
⭐2	-	**Navigation area "main section":** Shows a list with all main sections.
⭐3	-	**Navigation area "sub section":** Shows a list with all sub section of the current selected main section.
⭐4	-	**Configuration area:** In this area all configuration options are displayed.
⭐5	-	**Functions:** The button *"OK"* saves all changes and closes the configuration. The button *"Cancel"* discards all changes and closes the configuration. The button *"Apply"* saves all changes without closing the configuration afterwards. With the button "⚙" the user can import a previous exported configuration or a previous exported body part configuration[1]. With the button "⚙" the user can export the complete configuration or only the body part configuration.

> **ℹ NOTE**
>
> The content of the configuration sections is depending on the user role of the logged-in user.

4.1 Common

In this section the user can configure common settings.

4.1.1 View

When activating the option *"Full screen"* CONAXX 2 will start in full screen mode.

In the section *"Image viewing"* the user can configure the size of *"text annotations"*, *"laterality markers"* and *"resize handles"*. The option "*Visual size*" can be used to configure how large the handles are displayed regardless of the active area that can be configured with the option "*Relative size of the handles*". Furthermore, the "*Zoom step*" can be configured.

Use the option *"Show overlays"* to configure the displayed overlays. To add an overlay to one of the four overlay areas use the button "✚". To remove an overlay use the button "➖". To change the order of the overlays use the buttons "▲" and "▼". Activate the option *"Show description"* to display the descriptions of the overlays.

When activating the option *"Full screen"* CONAXX 2 will start in full screen mode.

In the section *"Waiting room – Patient list"* the user can configure the visibility of additional information in patient list of the waiting room.

The "*X-ray - New x-ray job - QuickJob list*" area offers two display modes for the QuickJobs list. With the option "Show only QuickJobs containing different body parts" only QuickJobs that combine x-ray job definitions of different body parts are offered for selection next to the homunculus when creating new x-ray jobs. *"Show all QuickJobs"* lists all configured QuickJobs regardless of their content.

4.1.2 Handling

When the option *"Show cropping recommendation"* is activated CONAXX 2 will show the cropping frame automatically as soon as the user opens an image.

For a fixed cropping frame activate the option *"Fix cropping frame"*.

To make annotations resizable activate the option *"Resizable annotation"*.

When the option "*Exposure series*" is activated CONAXX 2 select the next x-ray job with the status "Created" immediately after the current x-ray job gets the status "Exposed". This will continue until there is no x-ray job in the x-ray job list with the status "Created".

When the option "*Use acoustic signals for the image acquisition*" is activated the program will play different sounds while the image acquisition. These sounds reflect the state of the modality.

When activating the option "*Use On-Screen keyboard*" the program will open the keyboard automatically. This option is available for devices with touch screen.

If the option "*Show fullscreen preview"* is active a full screen preview of the current exposed image will be displayed for a configured time period.

With the option "*Remove patient automatically from waiting room*" you can configure under what condition a patient is automatically removed from the waiting room.

If the "*Allow sort x-ray job list*" option is enabled, the "*Sort*" button (⭳) is displayed below the x-ray job list. In addition, the x-ray job list can be sorted by drag and drop using the left mouse button.

4.1.3　Messages

In this section notification windows can be enabled or disabled.

4.1.4　Text templates

In this section the user can predefine text templates for *"Text annotations"*, *"Image comments"*, *"Keywords"*, *"Referring physician"*, *"Performing physician"*, *"Station"*, *"Color"*, *"X-ray journal descriptions"* and *"X-ray journal – reject reasons"*.

To add text to the lists, use the button "+". To remove a text, use the button "−". To edit text, use the button "✎".

4.2　Body parts

In this section the user can configure body part settings.

4.2.1　QuickJobs

The section is used to configure QuickJobs.

In the list *"QuickJobs"* all existing QuickJobs are listed. Use the button "+" to add a QuickJob. Use the button "−" to remove the selected QuickJob. The button "✎" renames the selected QuickJob.

When selecting a QuickJob the second list shows all contained x-ray jobs. Use the button "+" to add another x-ray job to the QuickJob. The button "−" removes the selected x-ray job from the QuickJob.

The *"Emergency X-ray Job"* list can be used to create a QuickJob that runs automatically whenever an emergency patient is selected in the waiting room and the button "*Select patient*" is clicked. Use the button "+" to add another x-ray job to the QuickJob. The button "−" removes the selected x-ray job from the QuickJob.

4.2.2　Breed

The section is used to configure breeds.

In the list *"Species"* all existing species are listed. When selecting a species the second list shows all contained breeds. Use the button "+" to add another breed. The button "−" removes the selected breed. The button "✎" renames the selected breed.

5 Safety and Maintenance

5.1 Introduction

In this chapter you will find information about safety and maintenance that are necessary to ensure the correct and reliable function of the software after installation.

5.2 Inspection and maintenance

> ⚠️ **WARNING!**
>
> **No maintenance or repair work may be performed while the software CONAXX 2 is being used with a patient!**
>
> **All maintenance and repair work may only be performed by personnel trained or authorized by PROTEC.**

5.2.1 Daily Monitoring before and during the Examination operation

When starting the software CONAXX 2, make sure that the software starts without an error message. In general, the warning and error messages that the software reports must be observed.

5.2.2 Maintenance

The required maintenance as soon as a software update is available must be carried out by PROTEC service department or a service company authorized by them in order to ensure the safe and reliable functionality of the software.

In the event that the planned maintenance is not carried out, PROTEC GmbH & Co. KG assumes no liability whatsoever for damage to the user and third parties if damage results from inadequate or not carried out maintenance.

Prior to the examination operation, the user must satisfy himself that all appliances listed in the operating instructions and serving safety are in working order and that the software is ready for operation.

5.2.3 Warranty

> ℹ️ **NOTE**
>
> You will find the current warranty conditions in your order documents or in the price list valid at the time of purchase.

Repairs and spare parts in the event of improper use are also excluded.

Warranty work may only be carried out by trained specialists.

5.2.4 Product Service Life

The service life ends with the discontinuation of product support. After reaching the product lifetime, further use is at your own risk.

6 Description of Symbols, Labels and Abbreviations

6.1 Symbols

⚠	Attention, observe accompanying documents
📖	Refer to Instructions for use
🏭	Manufacturer
REF	Order reference
SN	Serial number
📅	Production date

6.2 Type Label

CONAXX 2
Version 2.2.1

REF **4330-0-2000**
SN **SNxxxxxx**
📅 **2024**

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TL4330-0-2000V05

6.3 Abbreviations

mm	Millimeters
cm	Centimeters
DIN	Deutsche Industrie-Norm (German Industry Standard)
EN	European Standard
CE	CE marking
SN	Serial number
DR	Direct Radiography
SID	Source Image Distance

Appendix 1: Keyboard shortcuts

The following table provides an overview of the keyboard shortcuts that are available in the area "Diagnosis".

Keyboard shortcut		Function	Keyboard shortcut		Function	Keyboard shortcut		Function
F2		Quick help				ALT + F4		Close Diagnostic Viewer
F11		Full screen						
1		Tool "windowing"	CTRL + 1		Tiling 1, 1			
2		Tool "Move image (Panning)"	CTRL + 2		Tiling 2, 1			
3		Tool "magnifier"	CTRL + 3		Tiling 1, 2			
4		Tool "Region windowing"	CTRL + 4		Tiling 2, 2			
			CTRL + 5		Show grid			
			CTRL + 6		Show ruler			
			CTRL + 7		Show overlays			
8		Full windowing	CTRL + 8		Zoom region			
9		Automatic windowing	CTRL + 9		Zoom 1:1			
0		Reset windowing	CTRL + 0		Fit to screen			
I		Invert	CTRL + A		Select all annotations	ALT + A		angle measurement
P		Professional Image Tuner	CTRL + D		Deselect all annotations	ALT + C		Circle measurement
R		Free rotaion	CTRL + E		Annotation rectangle	ALT + D		Distance measurment
S		Electronic shutter	CTRL + F		Annotation freehand	ALT + H		HD angle
X		Cropping	CTRL + L		Annotation laterality marker left	ALT + L		Angle between two lines
			CTRL + M		Annotation arrow	ALT + P		PennHIP measurement
			CTRL + O		Open image	ALT + R		Cardiothoracic ration
			CTRL + Q		Annotation rectangle	ALT + T		Tibial Plateau anlge (TPA)
						ALT + U		Radiographic Left Atrial Dimension (RLAD)
			CTRL + R		Annotation laterality marker right	ALT + V		Vertebral Heart Score (VHS)
			CTRL + T		Annotation test	ALT + W		Vertebral Left Atrial Score (VLAS)
			CTRL + W		Close image			
			CTRL + Y		Redo			
			CTRL + Z		Undo			
Del		Delete selection	CTRL + Del		Delete all annotations			
			CTRL + „-"		Zoom out			
			CTRL + „+"		Zoom in			
			CTRL + „*"		Equalize zoom			
			CTRL + Arrow left		Rotate left 90°			
			CTRL + Arrow up		Flip horizontal			
			CTRL + Arrow down		Flip vertical			
			CTRL + Arrow right		Rotate right 90°			