

Acquisition and diagnostic software

for X-ray images from DR flat panels or CR systems in
human and veterinary medicine





Professional acquisition software for X-ray images

dicomPACS[®] DX-R is a professional acquisition software for X-ray images from flat panel systems (DR) and CR units (computed radiography with imaging plates) by any manufacturer. In addition, the software controls X-ray generators and X-ray units of various manufacturers, providing a smooth and systematic workflow. A simple and user friendly GUI (graphical user interface) operated by touchscreen or mouse completes the system.

The professional **dicomPACS[®] DX-R** image processing can be adapted to individual user' needs and offers outstanding image quality in human and veterinary medicine. It has been specially developed to enable organ specific optimisation, guaranteeing the highest quality X-ray images.

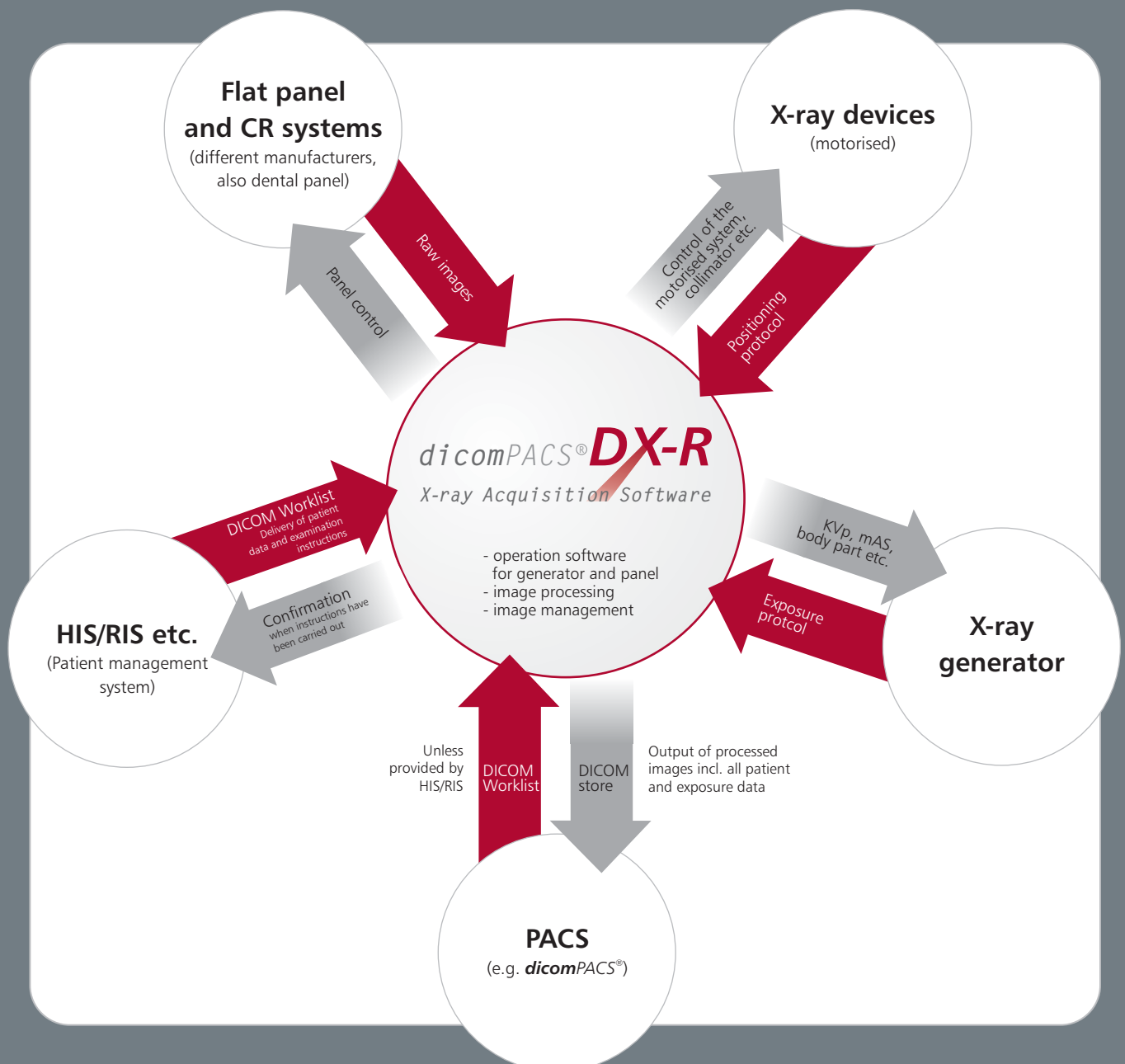
Many helpful integrated functions such as the radiographic positioning guide and intuitive operation greatly simplify daily routine tasks.

In addition, **dicomPACS[®] DX-R** allows integration with existing patient management systems. The integrated full **dicomPACS[®]** viewer even enables the user to diagnose X-ray images within the acquisition software. Therefore, the system can also be applied as fully-fledged diagnostic workstation with the option to upgrade to a PACS (Picture Archiving and Communication System).

dicomPACS[®] DX-R forms the core of a direct digital X-ray unit, whether it is a retrofit system to upgrade existing X-ray units, a complete new unit including generator control, or a portable suitcase solution for mobile X-ray generators.

Function principles

dicomPACS[®] *DX-R* software





Benefits

User friendliness and smooth workflow

- Modern graphical user interface (GUI) adaptable to almost **any language**
- **Touchscreen** operation – to ensure quick and efficient work and a smooth workflow
- Capture of patient data via **DICOM Worklist, BDT/GDT, HL7** or other protocols – data may also be captured manually
- Use of **DICOM Procedure Codes** for the transfer of all relevant examination data directly from the connected patient management system (HIS/RIS)
- **Freely configurable** body parts with more than **400 projections** and numerous possible adjustments in **human and veterinary medicine** already included
- Safe and fast **registration of emergency patients**
- Allows the user to **switch between examinations** of a patient, for instance to avoid having to re-position the patient frequently
- Allows the user to **subsequently add images** to an examination, even after that examination has already been completed
- Special tools for veterinary medicine, such as an extra dialog box for patient and owner data, integrated **hip dysplasia measuring, special image filters, multi generator operation** for alternating between mobile and stationary X-ray systems and much more...
- Entry of recurring **examination procedures as macros**, e.g. thorax screenings or pre-purchase examination for horses
- **Fully integrated radiographic positioning guide** for each examination in human and veterinary medicine incl. comprehensive notes, photos, videos and correct X-ray images
- Option to control a digital X-ray system via **wireless remote** incl. display of the worklist, preview of the image taken for checking and much more

Remote control for X-ray units



Wireless remote control for the taking of images



Screenshots

dicomPACS® DX-R software

Job creation

The correct settings for adults and children - or for horses, dogs and cats - are available at a mouse click

Chart for planning an individual X-ray job

Switch to planning X-ray jobs for children and babies

Radiographic positioning guide

Step-by-step video with sound for patient positioning

Shows an example of a correct X-ray image

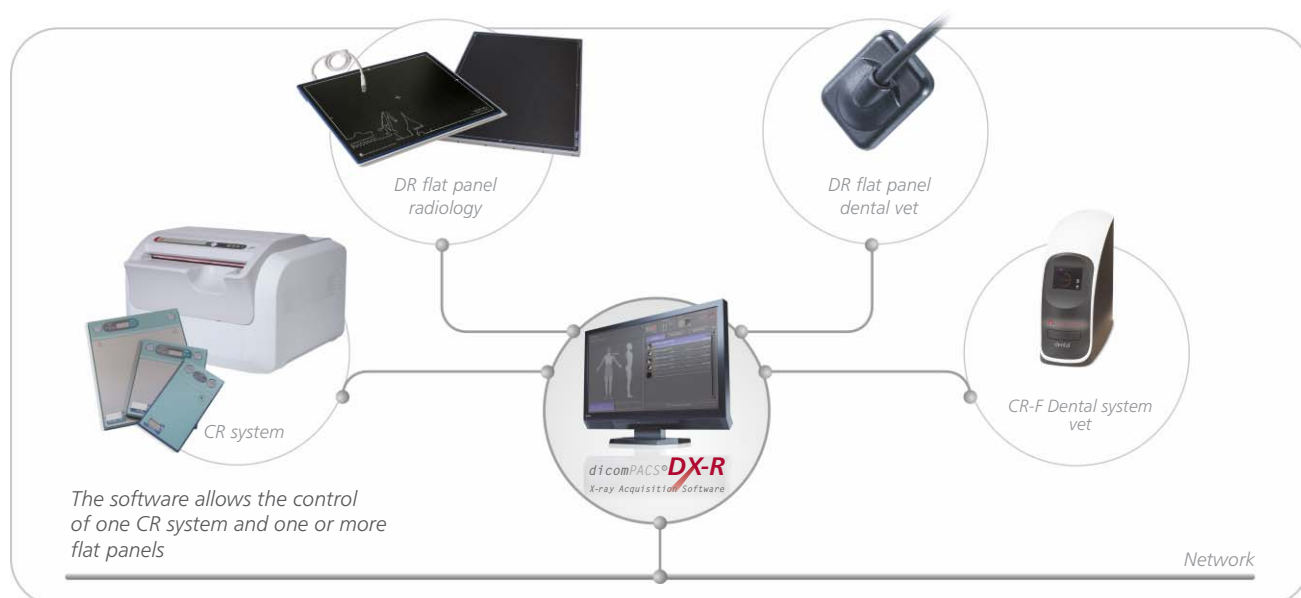
Presentation of helpful hints for the positioning of the patient, central beam, tips and tricks, frequent errors etc.

Opens examples of inaccurate X-ray images with comments

Benefits

Flexible image acquisition

- Integration of various **flat panel and CR systems** by different manufacturers
- Option to **connect up to 3 flat panels** (bucky, wall stand and mobile) to one system
- The **configurable generator interface** enables the user to control X-ray generators or X-ray systems by different manufacturers, delivering the generator settings directly from the software
- Option for the **parallel operation of a flat panel and a CR system** included in the standard package. The user has the choice to take the next image with either the flat panel or the integrated CR system. This flexibility also provides an **excellent emergency concept** in case of a defect flat panel.

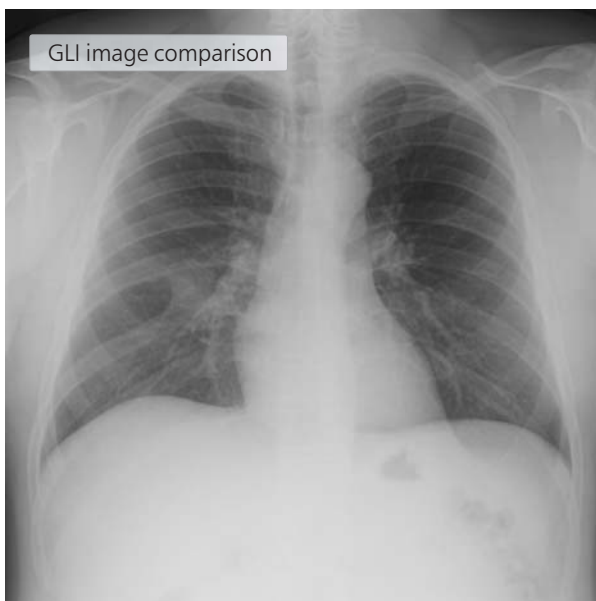


- **AEC** (Automatic Exposure Control) and **ARP** (Anatomical Programmed Radiography) allow the user to **automatically adjust all X-ray options** for each projection with an option to subsequently edit the image manually
- Integration of **dose area product meters** (DAP) – the readings are saved directly to the relevant image
- Electronic X-ray log

Benefits

The professional **dicomPACS[®] DX-R** image processing

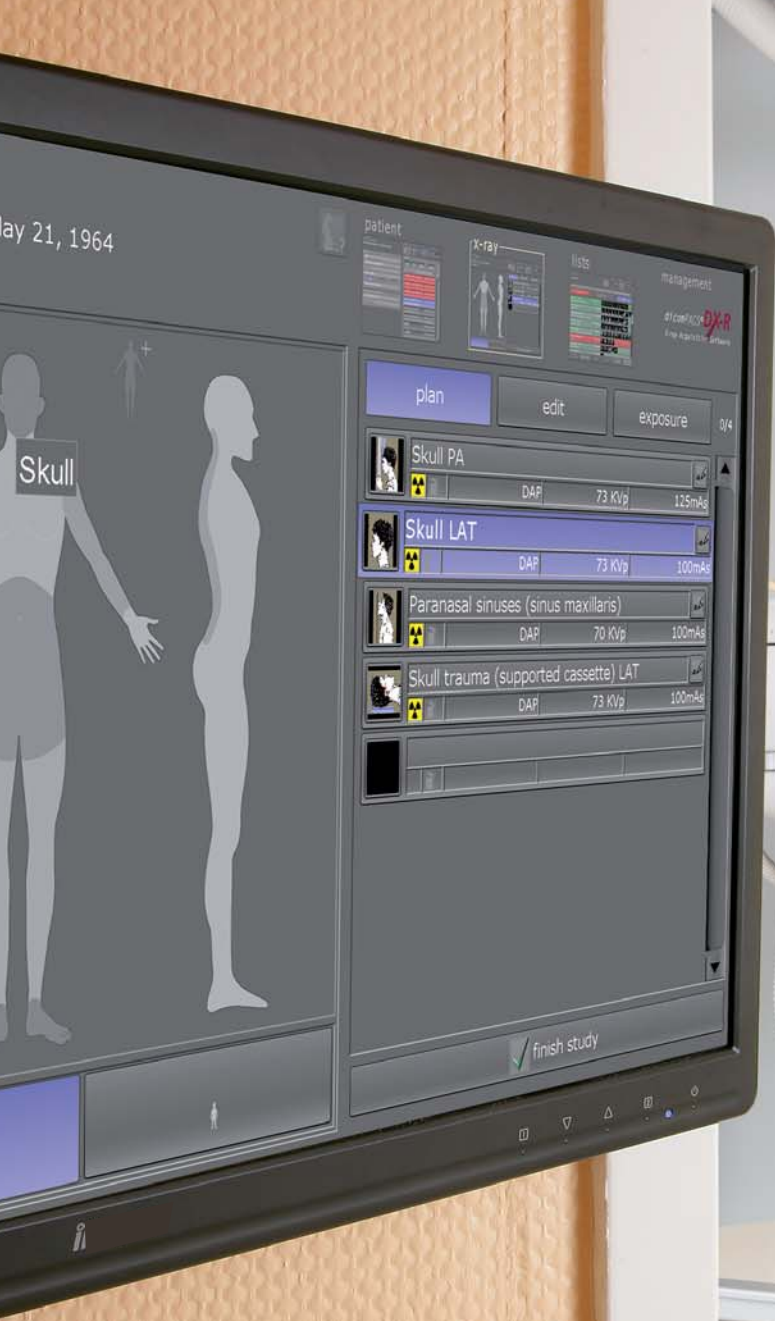
- Perfect images at all times – generally **no adjustment** required
- Integrated software for **automatic image optimisation**
- Professional, **adaptable image processing** for each individual examination to obtain best possible image settings for the needs of each customer
- Due to specially developed processes, the image processing allows the user to **vary the X-ray settings on a large scale** while the image quality remains virtually the same (**possibility of reducing the dosage**)
- **Bones and soft tissue** in one image – this enables the user to significantly improve his diagnosis
- **Details of bones and microstructures are very easy to recognise**
- Noise suppression
- **Black mask** (automatic shutters)
- Automatic **removal of grid lines** when using fixed grids
- **GLI (gridless imaging)** – reduction of scattered radiation:



Exposure without grid



Same exposure with GLI scatter reduction



Exposure with **conventional** image processing

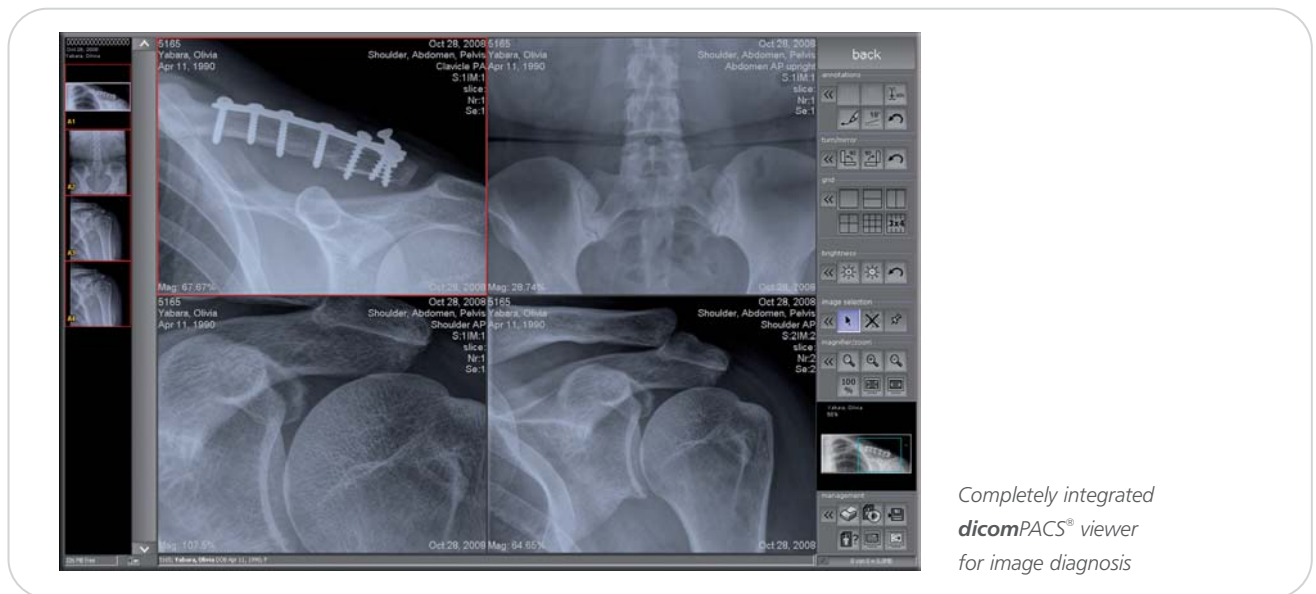


Exposure with **dicomPACS[®] DX-R** COP image processing

Benefits

Outstandingly sophisticated image diagnosis

- Completely integrated **dicomPACS® viewer for image diagnosis**, further processing and storage of images in an SQL database incl. image manipulations, export options, layout adjustments, freely configurable user interface and much more
- Stepless **zoom, PAN, magnifyer, ROI, crop, rotate, mirror** etc.
- Insert **image annotations**, e.g. free texts, arrows, ellipses etc.
- **Measur** distances, angles, areas and density



Completely integrated
dicomPACS® viewer
for image diagnosis

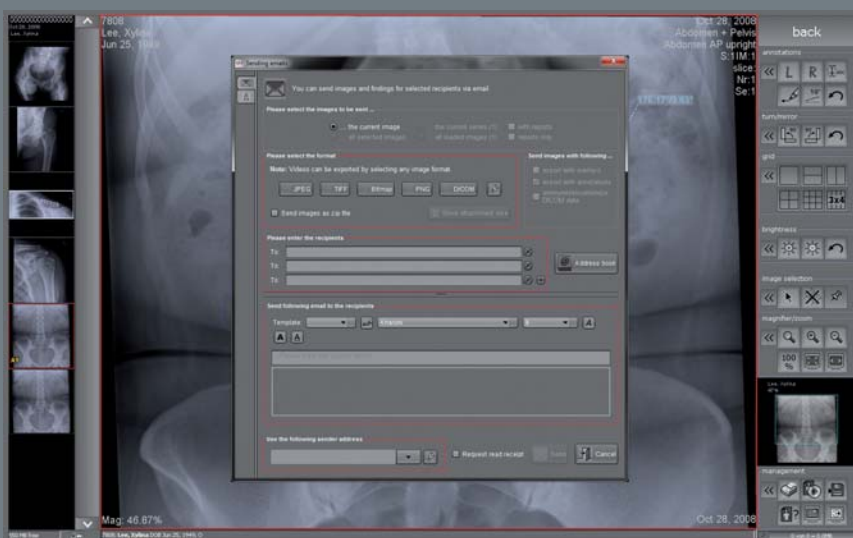
- Extended acquisition functionality for use in **mammography*** [see Page 14]
- **Special purpose tools for the veterinarian** (Specialised filters for the optimised depiction of bones and soft tissue, measurements for **TPLO** and **TTA, MMP, distraction index** determination, **cardiac measurements** etc.)
- Adjust window/level options and **gamma correction**, sharpening filters, noise suppression
- Many additional functions such as **chiro tools**, calculation of **Cobb's angle, HD measurements, pelvic obliquity measurements, integrated capturing of diagnostic reports** etc.
- Easily upgradable to the **integrated image management system (PACS)**

*Pending CE and FDA conformity approval for the module.

Benefits

Image export

- **Export images** to JPEG, TIFF, BMP and DICOM formats
- Print images both on Windows printers and laser imagers via **DICOM Basic Print**
- Creat **DICOM patient CDs** with free **WEB viewer**
- Inbuilt **email tool** to image distribution - no external email application necessary



Email tool

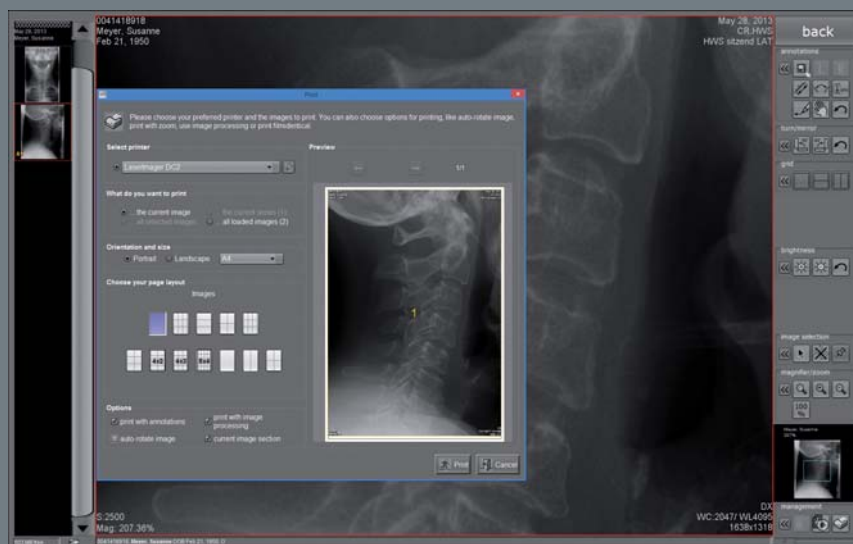
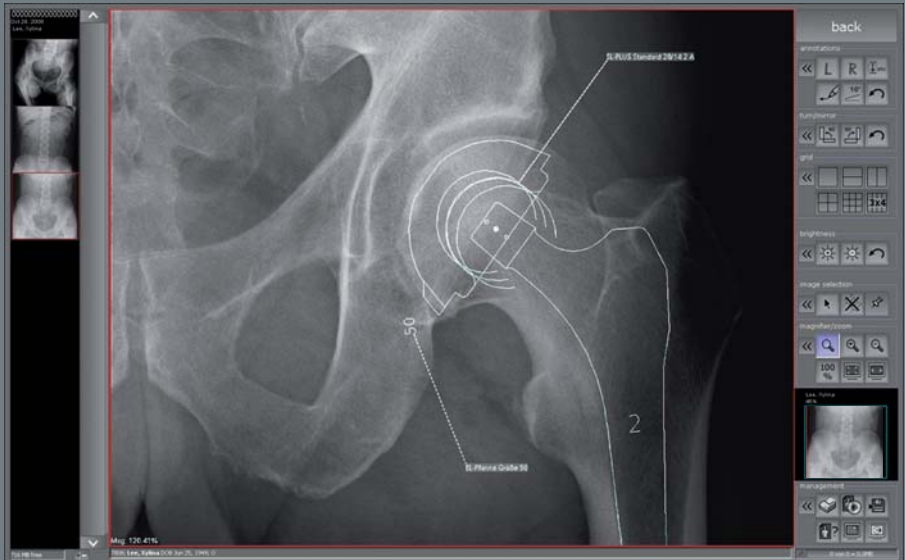


Image print

Integrated viewer



Completely integrated **dicomPACS®** viewer for image diagnosis



An integrated prosthesis documentation module provides preoperative planning (optional).



The system enables fast and easy customisation of the operating interface for individual customer preferences.

Useful tools such as the configurable measuring magnifier make diagnosis much easier.



The stitching module merges a number of separate digital X-ray images into a single image.



Comprehensive search tools enable the comparison of X-ray examinations of one or more patients.



Cloud based **ORCA**

The DICOM cloud for medical images and documents

ORCA (OR Technology Cloud Archiving) is a cloud based platform specially designed for storing, viewing and sharing medical images and documents. **ORCA** offers two exciting applications: **ORCA Archive** and **ORCA Share**.

ORCA Archive transfers and stores image files from direct sources (e.g. digital X-ray, CT, MRI and ultrasound systems) as well as from Picture Archiving and Communication Systems (PACS). **ORCA Archive** can be used as a backup solution. Wherever the internet is accessible, images archived in the cloud can be viewed at maximal resolution and quality (DICOM) via the integrated browser based **ORCA View** program and our acquisition software **dicomPACS**[®].

At the same time, **ORCA** is a platform for sharing data with external partners. The application **ORCA Share** facilitates exchanging images and medical findings with staff, colleagues and specialists. It can also be used to give patients access to medical reports and images. Recipients are sent an access link via email. There is no need to install software locally.

Benefits of Cloud archiving through **ORCA**

Fast access: Register on <https://orca.de.com> and begin working with **ORCA** immediately.

No expensive equipment: **ORCA** provides access to remote servers and software solutions. There is no need for an office filled with expensive equipment. Billing is usage based (flat rate or pay per use).

Excellent scalability: System memory can be adjusted according to your requirements.

24/7 access: Images and documents are accessible at any time from all mobile and stationary devices with an internet connection.

Straightforward: The user friendly interface is self-explanatory. Support is available online.

No more service contracts: **ORCA** is automatically updated and serviced without extra charges.


Data security: **ORCA** guarantees automatic data backups and high security standards. Data loss as a result of malware or hardware failure is a thing of the past.

Accessibility: Excellent accessibility is **ORCA** top priority.


Fit for the future: **ORCA** archives all data in modern computing centres. The Server technology is updated regularly.

Communication: **ORCA** is also a communication platform. Sharing images and documents with doctors and other authorised persons is a breeze.

Optimal workflow: **ORCA**'s many special functions and settings make workflow customisation easy.



Share images and documents

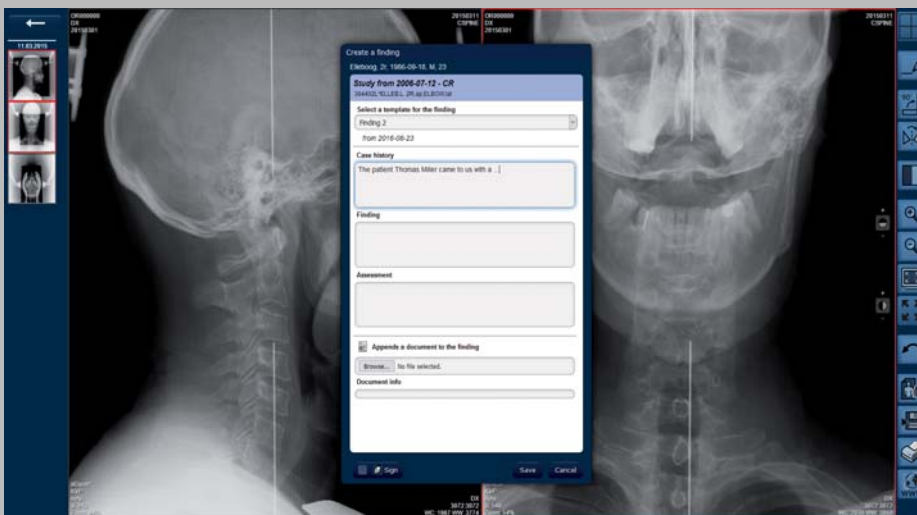


Archive images and documents





Print images and documents



Medical reports including customisable report templates



Various functions for image processing: image inversion, brightness and contrast adjustment, resizing

ORCA View is a web based image viewer offering file sharing capabilities (email with integrated address book, image anonymisation, etc.), print and export functions, as well as all basic functions for viewing and analysing images:

- Image annotation in various colours (e.g., arrow, text)
- Measurement (e.g., length, angle)
- Findings reports including custom report templates
- File attachment
- Image comparison using different grids
- Image rotation and mirroring
- Brightness and contrast adjustment
- Image inversion, zooming in/out
- Full screen and fit image modes
- Image panning
- Image series scrolling

Fit for mammography

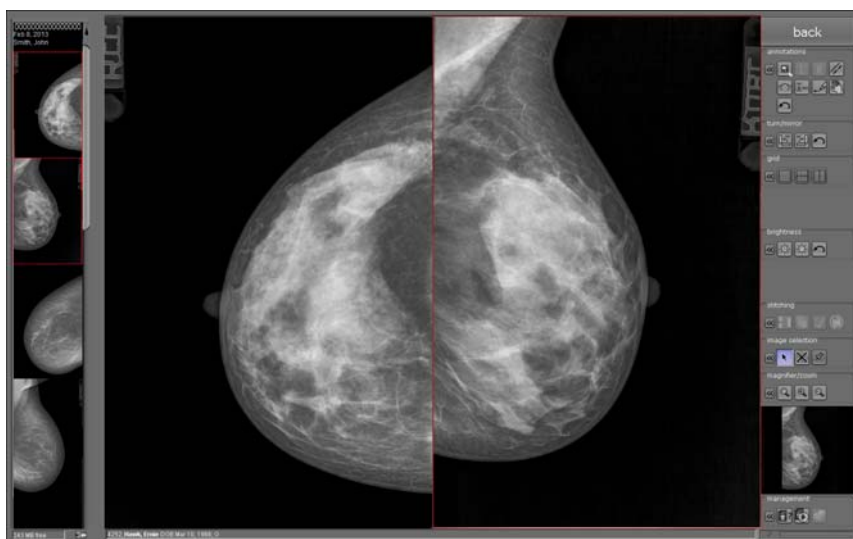
dicomPACS® DX-R includes a new module for mammography exposures [optional]

Extended acquisition functionality for use in mammography*:

- Specialised organ tree
- Mammography Hanging Protocols
- Documentation of additional examination parameters such as filter, thickness, angle, implant
- Mammography tools in the console viewer:
 - 100% magnification
 - Mammo inversion function
 - Mammo grid function (quadrant diagnosis)



Job creation with specialised mammography organ tree



Fully integrated viewer for diagnosing with specialised mammography tools

*Pending CE and FDA conformity approval for the module.



Special Tools

dicomPACS[®] Diagnostic tools for Upper Cervical Chiropractic (NUCCA)

The Upper Cervical Chiropractic tool set has been created in cooperation with leading NUCCA experts from the US and Canada. It offers a variety of ways to reach a fast and accurate diagnosis. Templates like the Cephalometer, Grid, Circumscale, and Relatoscope enable you to continue working as you are used to.

S-Line and Hard Palate Line

You simply set two points each on C1 and the hard palate to create the S-Line and the Hard Palate Line. We will show you the horizontal angles.

Raw Data Box

All measured values will be shown in the raw data box. You can also show and hide values manually.

Atlas Plane Line and Atlas Check Line

The horizontal angle and the angle between Atlas Plane Line and Atlas Check Line will be shown in the raw data box.

Squamous Sutures

Mark as many lateral aspects of the skull as you wish and even change the appearance of the markers.

Cephalometer and Central Skull Line

Use the Cephalometer to draw the Central Skull Line. Laterality and Skull Tippage will be calculated automatically. The Four Elements and Listing Information will be inserted.

Plane Line

Set two points and the line will be shortened automatically. The distance to the Atlas Plane Line will be shown in the raw data box.

Condylar Circle

Choose between the three point and four point Condylar Circle. The middle point will be shown. You can set the calculated measurement manually to the value you prefer. The Relatoscope will use the shown value.

Axial Circle

The Body Center Line will be set automatically and the Axial Circle will be calculated and shown on the side of laterality. You can set the calculated measurement manually to the value you prefer.

Circumscale and Grid

Activate the Circumscale or Grid template to double check the measurements of Condylar and Axial Circle and to set the points of the Axial Circle properly.

Odontoid Center on Vertex

Mark the lateral aspects of the dens and the Odontoid Center Line will be inserted.

Vertex Square

After marking the C2 canal, the Vertex Square will be inserted and the Spinous value will be calculated depending on the Condylar Circle.

Odontoid, Spinous and Relatoscope

Use the Relatoscope to apply the Spinous value from Vertex to Nasium View. Mark the lateral aspects of the dens and the (corrected) Odontoid will be inserted automatically.

Lower Angle and Angular Rotation

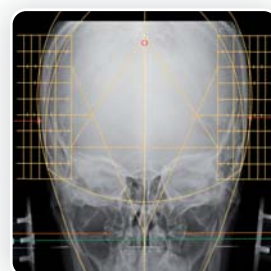
The Lower Angle and Angular Rotation will be calculated automatically after setting the Inferior Point. You can also set a corrected Inferior Point.

Intermastoid Line

Mark the inferior tips of the mastoid processes. The measured value, its orthogonal divergence from the Central Skull Line, will also appear in the raw data box.

Vertex Atlas Line

After marking the transverse foramina of the atlas with three points each, we will draw the Vertex Atlas Line and show the convergence of C1 and C2.



dicomPACS[®] Chiro tools for optimal diagnosis

The Chiro Tools have been developed in cooperation with experts from the US and Canada. They help to make an accurate diagnosis and plan further treatment efficiently. After you select points of interest manually, the tools generate automated center lines and points, defined curves, angle measurements and much more for you. Of course all standard tools are included, e.g. distance measurements, angle, Cobb angle and mark spots.

Axis line

The tool creates a vertical or horizontal axis, depending on the direction, in which the mouse pointer is moved.

Orthogonal line

This tool is used to mark perpendicular lines on existing or yet to be drawn baselines. The divergence from the x/y-axis (nearer axis) is displayed by default.

Vertebrae line

This tool generates a vertical line of six points (2x3) along the spinal canal and displays the lateral divergence and side of laterality in degrees.

George's line

This tool is used to draw vertical lines on each vertebra along the spine in a lateral view and to calculate their distances (in mm or inch).

Horizontal or vertical level

This tool calculates the horizontal or vertical level. By default the nearer axis is used for calculation.

Circumscale

An arc is drawn through three defining points and the diameter of the corresponding circle is displayed by default.

Spinal curve

This tool is used to draw an arc in the lateral view of the spine. The annotation uses a fixed radius set by default to 220 mm. Radius or degree can be adjusted manually.

Center point

This tool calculates the center point between two points.

Distance comparison

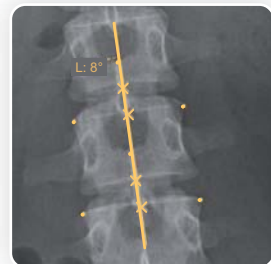
This tool compares the distances between three set points (between point 1 and point 2 and between point 2 and point 3) and shows the larger distance.

Pelvic obliquity

This tool is a measurement that is calculated automatically after two simple clicks which generate two horizontal lines showing the distance between these two parallels.

Edit / combine annotations

You can change the appearance of each annotation individually as well as the default. Annotations (points and measurements) can also be combined with already drawn points and lines.



Special functions

for veterinary medicine

Digital X-ray images have the advantage that exact measurements can be taken at the monitor and the image quality can be improved by a number of manipulations.

dicomPACS® DX-R now offers some special functions.

MMP (Modified Maquet Procedure)

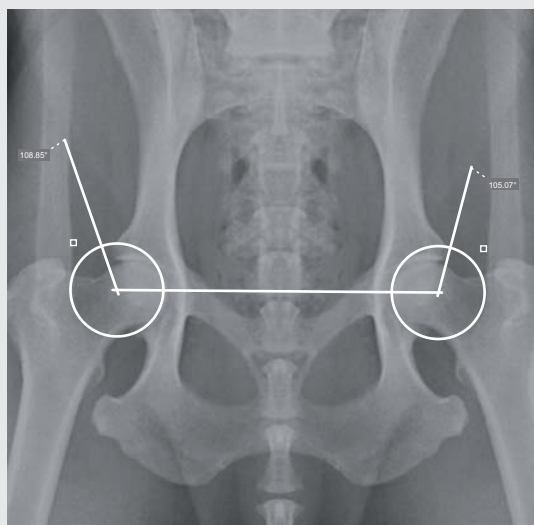
The MMP (Modified Maquet Procedure) is a method of measurement for dogs with a cruciate ligament disorder, in which the distance for the placement of the MMP Wedge is determined. Since angles and lines are calculated automatically, determining the wedge size only requires a few steps.

For this annotation we created an illustrated annotation guide with a help text indicating the correct step-by-step method of the measuring procedure. If lines or dots were placed inaccurately, corrections can be made throughout the measuring process by means of the Alt key.



HD measuring technique for dogs

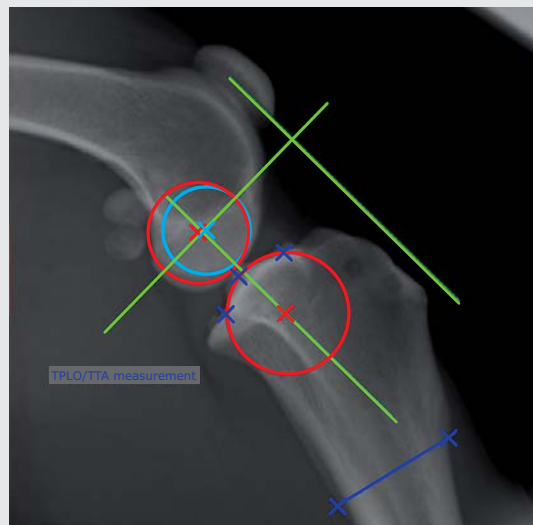
Hip dysplasia (HD) as a progressive fault in the hip joint is undoubtedly a common problem for the veterinarian, especially because the larger races are affected by it in particular. X-ray examination is a reliable way of judging the severity of the condition. A precondition for a meaningful diagnosis is the exact placing of the examined animal in a supine position with parallel extended femurs, the kneecaps turned in to line up with the direction of the X-rays. Additional exposures can be made with the femurs in a "frog position" or sideways (latero-lateral) to the X-rays. The Norberg Angle is an important assessment criterion. It is defined as the angle described between the centre of the femur head and the front edge of the socket.



TTA (Tibial Tuberosity Advancement)

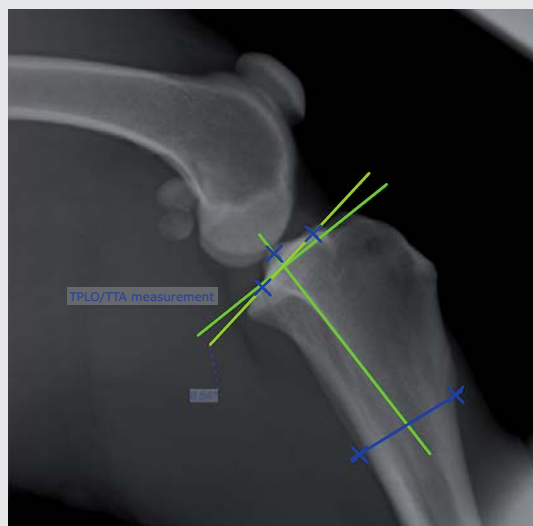
The TTA measuring technique for treating crucial ligament ruptures in dogs is one of the numerous functions of **dicomPACS®DX-R**.

When applying TTA (Tibial Tuberosity Advancement) as opposed to TPLO, osteotomy is applied to the non-load-bearing part of the tibia. Accordingly, the TTA measuring tool is used to apply the translated length measurements at the tuberositas tibiae.



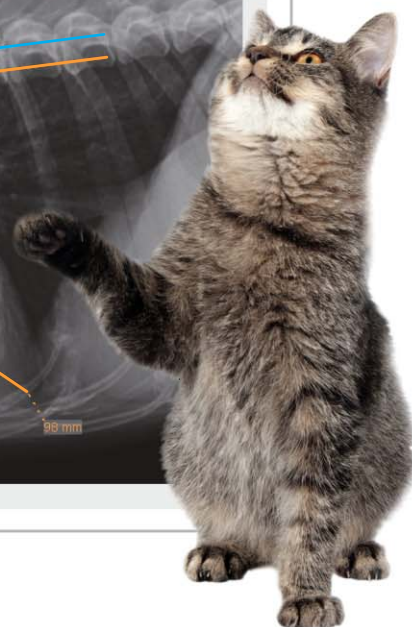
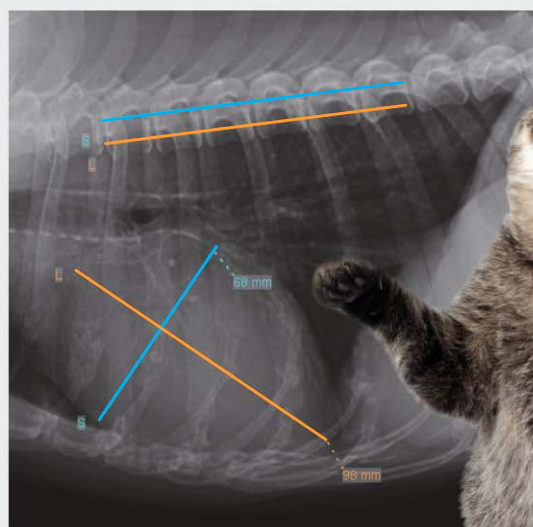
TPLO (Tibial Plateau Leveling Osteotomy)

It was necessary to implement this function, since crucial ligament ruptures in dogs are increasingly treated by changing biomechanics, using osteotomy – an operation procedure involving precision cutting through the bone and securing it in a changed position by means of plates and screws, with a view to permanently correct displacements. The TPLO measuring tool helps to determine the existing slope of the tibial plateau and its theoretical optimization. The TPLO provides the surgeon with a promising method to treat crucial ligament ruptures in dogs, allowing the patient to walk again without any pain within a short period after the operation.



Buchanan's Vertebral Heart Score

It has been designed specifically for cats and dogs. The length and width of the heart are put into relation to the individual animal's vertebral body width. Therefore, racial distinctions are brought to bear on the examinations results. The Vertebral Heart Score (VHS) is measured by the long axis (L) and the short axis (S) which are transposed onto the vertebral column and recorded as the number of the vertebrae beginning with the cranial edge of T4.



Special functions for veterinary medicine

Prosthesis documentation module

There are two options to plan an operation with prosthesis templates:

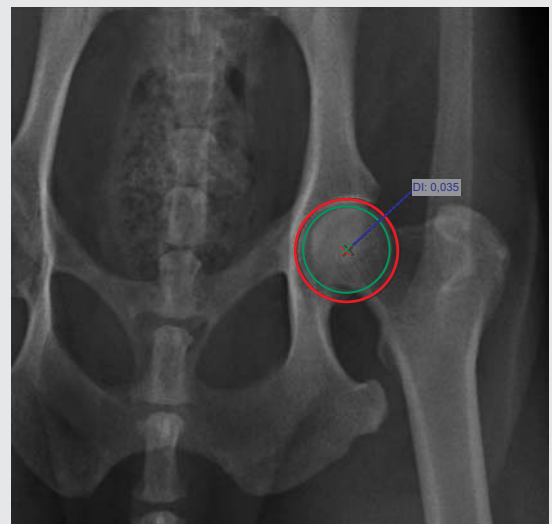
1. Planning and / or documenting operations by digitised prosthesis templates do not require a film identical image display. The prosthesis template is simply selected from a set of templates and displayed in the image as an annotation.
2. Planning with existing transparency prosthesis templates (provided by the manufacturers) requires a film identical image to be displayed on the monitor in the same size as an equivalent analogue X-ray image on film.



Measuring the distraction index

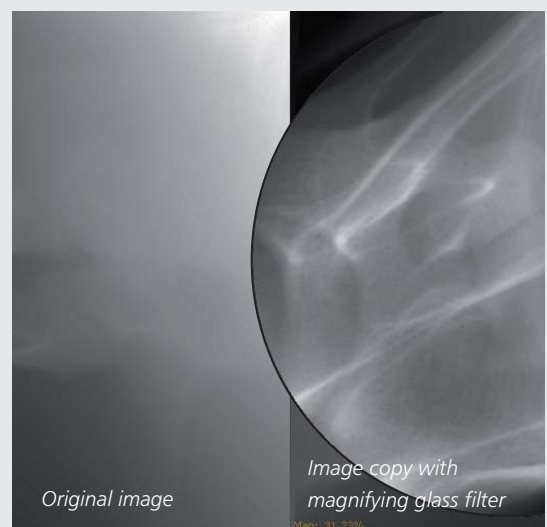
The distraction index measures how loose the hip joints are and is thus an important measuring instrument to assess hip dysplasia.

The distraction index serves to determine the displacement of the femoral head from the joint socket of the hip joint. This measuring function provides an easy tool for veterinary medicine to assess this displacement.



Special filter for the optimization of bones and soft parts

Image manipulation of conventional image processing systems is usually limited to brightness / contrast (Window level), dynamics or image sharpness. The disadvantage lies in the fact that changes always affect the whole image. This has the effect that special details do not become better visible without changing the whole image. In addition the manipulations do not accommodate the specific image quality in different regions of the X-ray image. For the best possible visualisation of details, the digital qualities of just the Region of Interest (ROI) should be electronically modified.





Modified Maquet Procedure

14mm

Modalities

Which flat panels and CR systems does **dicomPACS® DX-R** support?

dicomPACS® DX-R is a generally open system. Its conception and development was independent of hardware manufacturers.

Components from the following manufacturers have already been integrated (We are continuously working on the integration of new models and manufacturers): →



Generator control

The generator screen displays all recommended values and settings (kVp, mAs, focus etc.). These settings may be adapted to the system used.

Flat panels

ATLAIM



DRTECH



Kodak | Dental Systems



THALES

TOSHIBA



VIEWWORKS

CR systems

3DISC



FUJIFILM
OEM device

Extension

Options for upgrading **dicomPACS® DX-R**

dicomPACS® DX-R may not only be used as a software for the acquisition and processing of X-ray images, but can also be upgraded to a MiniPACS or even to an Enterprise Multi Modality PACS. Thousands of installed workstations in over 60 countries (as of 4/2014) prove that our customers are satisfied.

A single workstation system with installed **dicomPACS® DX-R** software can be upgraded with the following options (extract):

Further optional viewer functions:

- May be installed on **Apple MAC and Linux** systems
- Generation of full leg / full spine images (**Image stitching**)
- Preparation of diagnostic reports with integrated images in MS Word
- Connection of several diagnostic monitors
- Capturing additional patient and examination data and freely configurable **statistical analysis**
- Working with **digital prosthesis templates for surgery planning** and documentation - Prosthesis templates can be selected from a set and inserted into the image as annotations
- Additional radiological functions such as Maximum Intensity Projection (**MIP**), Multiplanar Reconstruction (**MPR**), hanging protocols and mammography tools
- Fast and easy preparation of **equine pre-purchase examinations** with automatically inserted X-ray images (only for Germany)
- And much more...



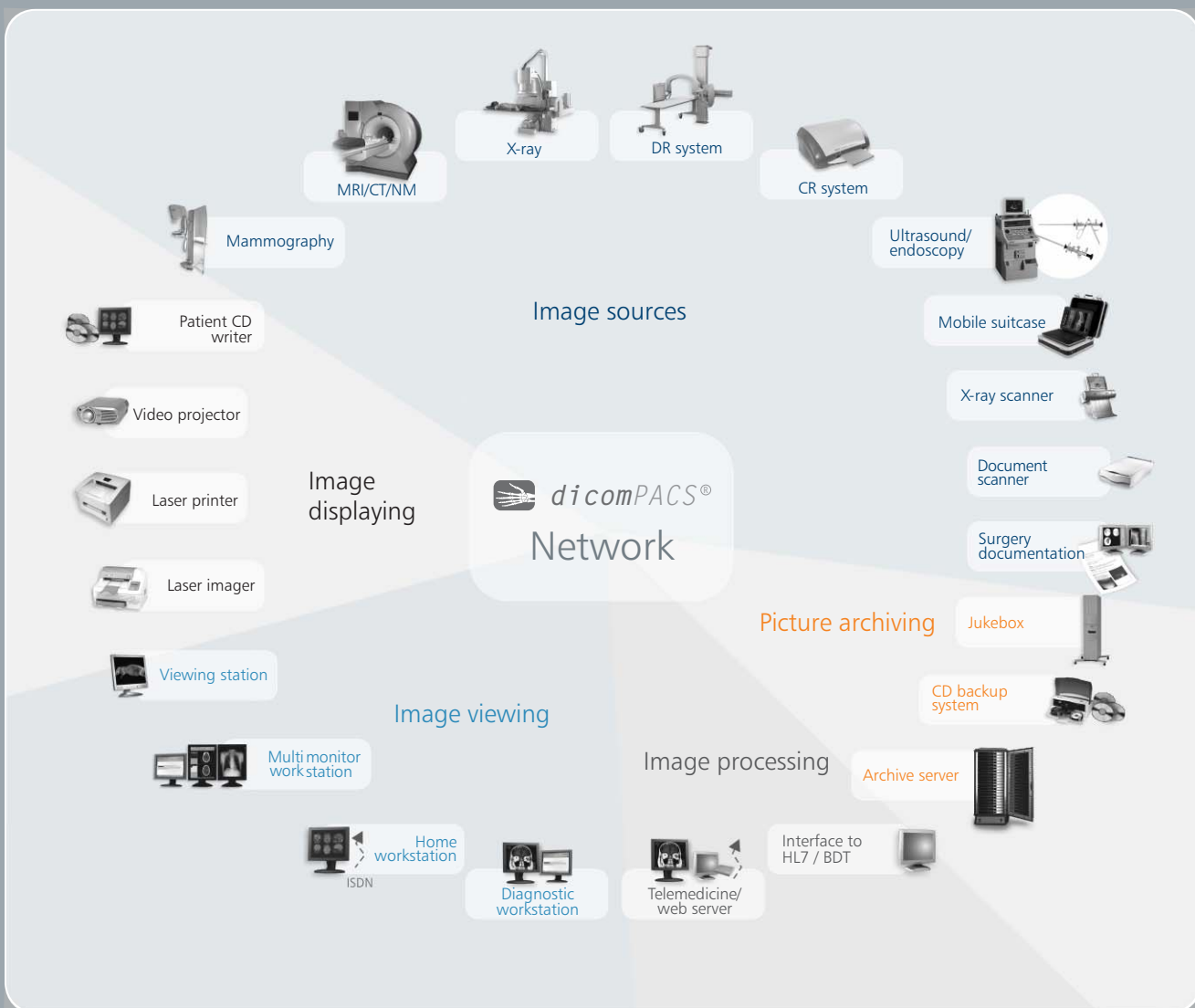
The stitching module merges a number of separate digital X-ray images into a single image. You can load, correctly align and merge any number of original images.

Extension

Upgrade to an integrated multi-modality PACS

- **DICOM reception** from any DICOM sources, e.g. CT, MRI, scintigraphy, ultrasound etc
- **DICOM distribution** with freely configurable rules
- **DICOM DIR import** for archiving patient CDs by other manufacturers
- **DICOM Query/Retrieve** (SCP/ SCU)
- DICOM Auto **Pre-fetching**
- **DICOM Print Server** to convert DICOM Basic Print into Windows print jobs
- **DICOM Compression** according to freely configurable rules
- DICOM CD/DVD Backup Module, also via robot systems
- Integration of **film and document scanners**
- Digitalisation of standard and non-standard video signals, e.g. **endoscopy, angiography** etc.
- Fully automatic **synchronisation** of two image databases, e.g. laptop and main archive
- **Exchange of images and diagnostic** reports between individual clinics by means of teleradiology
- **MobileView**: distributes images within a hospital and displays the images in a web browser
- **ORCA cloud based solution**: enables worldwide image distribution to referring doctors and patients via the internet

Network overview



Portfolio Overview - products of OR Technology



Medici DR Systems

DR retrofits - digital upgrade set for existing X-ray systems incl. **dicomPACS®DX-R** acquisition software, also available for stationary and mobile X-ray machines



Leonardo DR Systems

DR suitcases - compact suitcase solutions for portable X-ray incl. **dicomPACS®DX-R** acquisition software



Amadeo X-ray Systems

Complete digital X-ray systems (incl. stand, bucky, generator, flat panel incl. **dicomPACS®DX-R** acquisition software etc.) as well as mobile and portable X-ray solutions



Divario CR Systems

CR solutions - CR systems for digital X-ray with cassettes incl. **dicomPACS®DX-R** acquisition software



X-ray Accessories

Accessories for X-ray (e.g. radiation protection walls, gloves etc.)



dicomPACS®

Image management (PACS) - comprises acquisition, processing, diagnosis, transfer and archiving of image material



ORCA

Cloud-based archive solution - safe, long-term archiving of patient data with intelligent usage of internal databases, communication platform with colleagues and specialists and transfer of image data to patients



dicomPACS®DX-R
X-ray Acquisition Software

X-ray acquisition software [only for OEMs] - acquisition and diagnostic software for X-ray images from flat panels or CR systems



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