



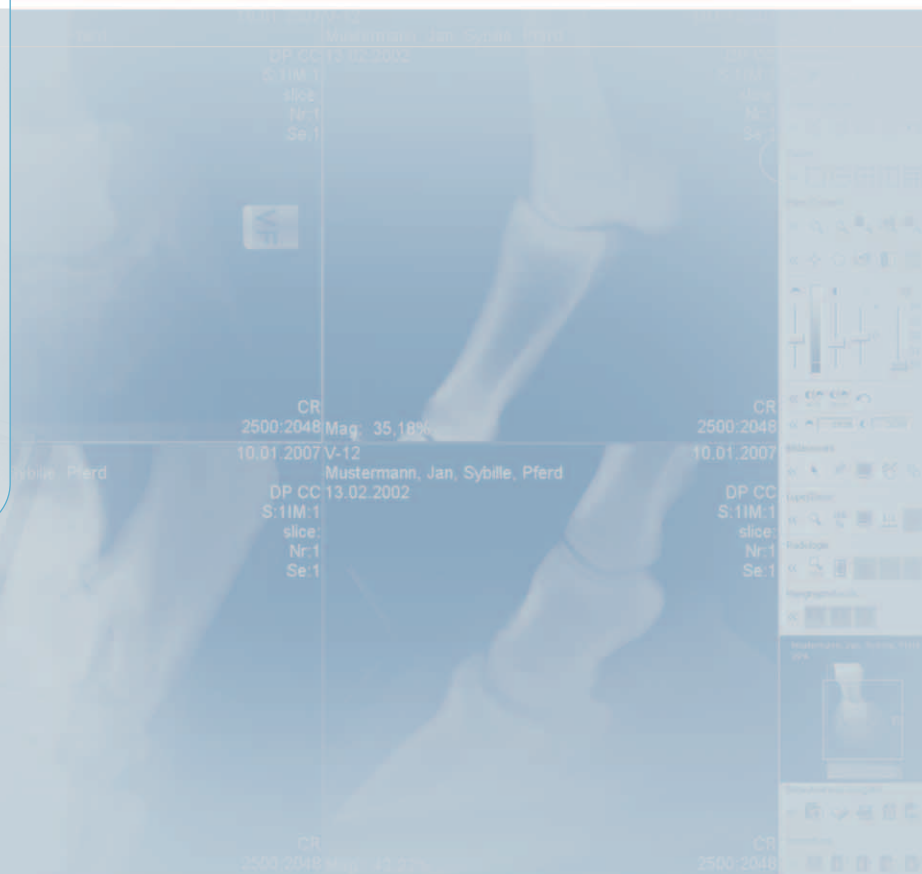
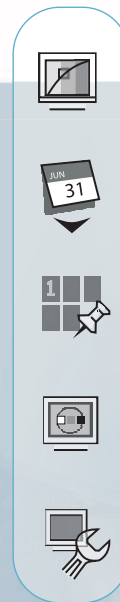
dicomPACS[®] **vet** Module description

Module name: *dicomPACS*[®] **vet Diagnostic Module Standard**

Version number: 5.1

State : October 30th 2006

Order code: L-1000



Diagnostic Module Standard

Introduction:

The **dicomPACS® vet** Diagnostic Module Standard (Viewer) forms the basis of each workstation and without it using other **dicomPACS® vet** modules (e.g. Video or Scan Module) is impossible.

The module is characterised by its outstanding operating concept and large range of functions. It is suitable for diagnosing all image types (e.g. CR, DR, CT, MRI, NM, US, endoscopy etc.) and has proved itself in veterinary hospitals and all types of veterinary practices for years.

Basic characteristics:

- Developed in conjunction with radiologists, orthopaedists and surgeons as multimedia-based medical report (electronic medical report)
- Administers images, films, documents (e.g. pdf, XLS, DOC or similar) and audio recordings of all types
- All objects are saved in DICOM format only
- Easy to use: brieftraining course and quick familiarisation help limit expenses
- Highest image quality by different interpolation and filter techniques
- Extremely fast, even with large image series (e.g.

multislice CT)

- Parallel processing, as loading of images/series takes place in the background. The user can start working on the first image while further images are still being loaded.
- Optimal workflow due to:
 - o Operating concept, which includes a configurable and intuitive user interface and configurable short-cuts for nearly all functions (both are configurable for user and workstation)
 - o Integrated administration of image status (diagnosed, undiagnosed)
 - o The retention of several worklists
- "Perfect Memory", i.e. an image is re-opened with all previous annotations and settings, including zoom and positioning intact
- Using an unlimited number of programme windows without reducing speed (depending on RAM size)
 - o Example: A veterinarian may quickly open a new window to view images of an emergency without losing the screen layout just finished for a complex MRI examination.
- Platform independence by consistent object-

oriented development in JAVA, which guarantees highest possible investment security

Overview of functions:

Administration:

- Patient and image administration, including diary and status functions (diagnosed and undiagnosed etc.)
- Generates study list of the last patient loaded with preview images (thumbnails)
- Manual entry of new patients
- Own worklist for non-DICOM compatible modalities (e.g. endoscopy)
- Archives new and/or imported images
- Deletes and renaming images (password protected)
- Creates diagnoses
- Copies diagnoses into the Windows clipboard
- Inserts diagnoses from the Windows clipboard into a study
- Displays all DICOM information (header) of an image
- Enters further patient and study information. This additional information is available for easy statistical analysis with the optional Statistics

- Module (L 1010).
- Recovers locally created images (e.g. from a scanner or digital camera)
- Sets the status diagnosed in the data base
- Executes a daily visual check of the monitors, which confirms the suitability of the monitors for viewing and diagnostic purposes

Acquisition and output of images:

- Imports and exports images in the formats *.JPG, *.TIF, *.BMP, *.PNG and *.DCM (DICOM format)
- Imports and exports sequences in the formats *.MPG und *.AVI
- Prints images with configurable print layouts on all printers with Windows drivers
- Imports (manually or automatically) several images at once (directory import)
- Changes over to the PMS (practice management system); condition: installation of the BDT/GDT Interface
- Starts an external dictation function
- Creates a copy from one or more images
- Copies an image to the clipboard from where you can insert the image into other programmes, for example into MS Word.

- Inserts an image from the clipboard into the viewer

Zoom and magnifying glass:

- Continuous zoom function
- Configurable magnifying glass
- 100% display (one pixel on the monitor corresponds exactly to one pixel of the original image)
- Fits images to their selected grid areas (fit image)
- Applies zoom to a whole series or sequence
- Right mouse button configurable to operate certain tools (e.g. window level, zoom, magnifying glass)

Selection and closing of images:

- Selects and deselects single images for later processing (printing, export etc)
- Selects and deselects all loaded images
- Resorts images within a series
- Closes single images or all loaded images

Image manipulation (filters):

- Processes greyscale and colour images
- Adjusts window level values for 10, 12, and 16

bit greyscale images, including use of values from predefined DICOM tags and definition of own standard values

- Autolevel calculates the optimal window level values for the highlighted image or series
- Windowing of a complete series or sequence
- Changes in dynamics
- Inverted display of images
- 3D filter, soft focus, definition filters etc. adjustable in degrees
- Magnifying glass with integrated filter, various filters can be selected
- Definition and adjustment of LUTs (Look Up Tables)
- Definition and adjustment of Monitor LUTs (for example blue-based)

Image processing:

- Unlimited number of open program windows can be displayed on a monitor without reducing speed (depending on RAM size)
- Fast sorting of images and series into various grids or additional program windows
- PAN tool quickly moves images within their grid area
- Rotates and flips images or series

- Displays images in freely configurable grids (e.g. 1×1, 2×1, 2×2, 3×2, 3×4, 5×4 etc.)
- Interpolates image data on the monitor for enlargement
- Full screen view
- Scrolling through series and/or sequences
- Cineloop display for video sequences
- Parallel display of images or series and/or sequences
- Synchronous scrolling through several series

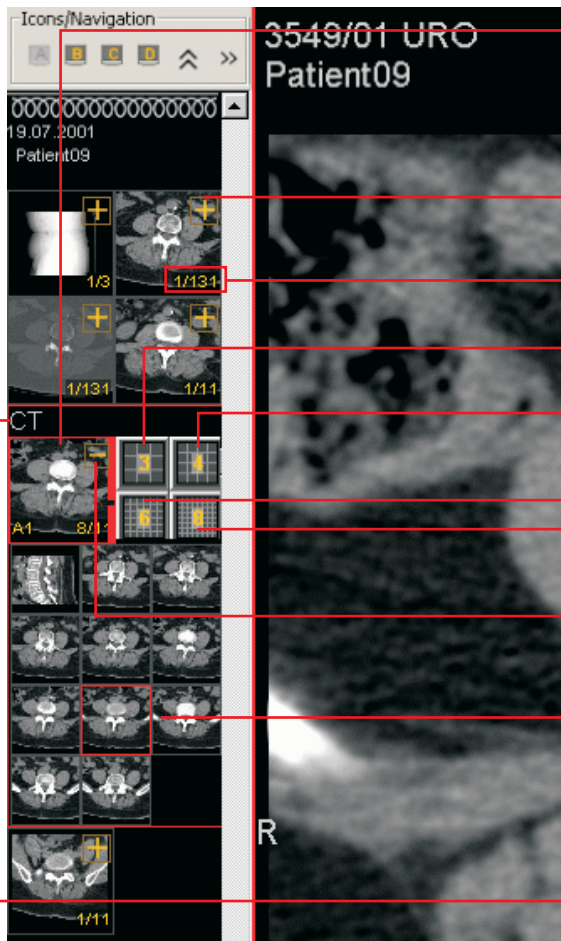
Measurements / Annotations:

- Measures distances
- Measures angles, also without crossing angle legs in the image (Cobb's angle)
- Measures the length of open or closed irregular shapes
- Density and area measurement in rectangles, circles and ellipses
- Hounsfield units
- Automatic calibration for DICOM images, or manual calibration based on a reference object in the image
- Displays values in various units (mm, cm, inch etc.)
- Draws arrows, enters notes

- Hides and displays all measurements and annotations
- Deletes single or multiple annotations
- Editing and changing of annotations
- Automatically displays cutlines for CT and MRI studies
- Hides/ displays delimiting cutlines in CT or MRI series
- Draws frame for the black border in X-ray images
- Groups any annotations to fitting or rotation
- Configures annotations colour and the overlays (DICOM information)
- Configures strokes, text type face and font sizes

Navigation bar:

In the navigation bar, all loaded images, series or documents are shown as preview images. Series of MR and/or CT images are shown in two columns. At a mouse click on "+" in the right upper corner a series, it is unfolded. All images of this series can be represented in three, four, six or eight columns. The advantage of this representation method is that you can navigate faster inside a series. Required images are found faster.



3549/01 URO
Patient09

The thick red line indicates that it is about a series of images. The small black point in the line shows the position of the image in the series. Here the 8 image of 14 is represented.

Unfolds the series

Number of images of a series (1/131) = the 1. image of 131

Images are arranged in 3 columns (as in this example)

Images are arranged in 4 columns

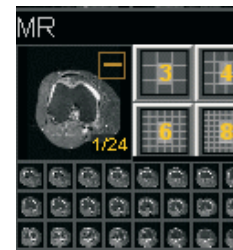
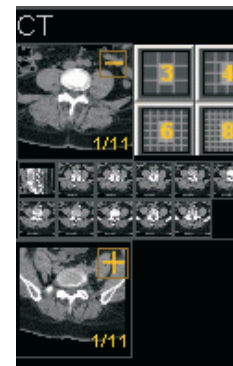
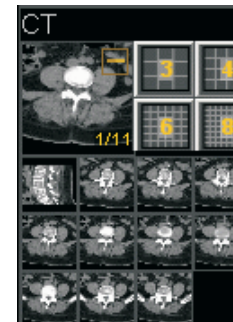
Images are arranged in 6 columns

Images are arranged in 8 columns

Shuts the series

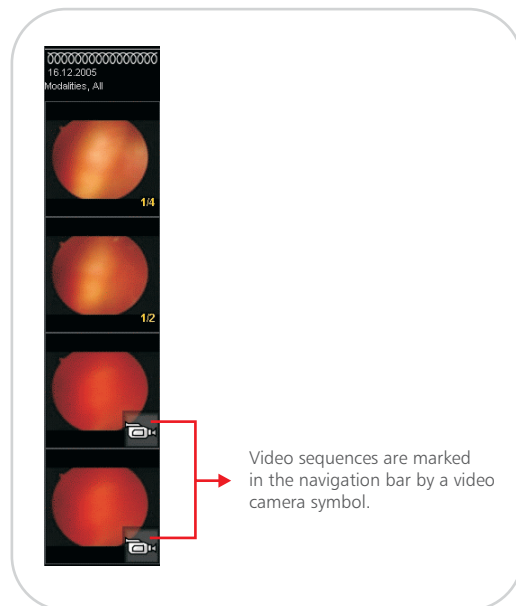
Representation of the 11 images in 3 columns and 4 lines; the 8. image is selected and is shown in the working area

Indication of the modality



Representing a series in 4, 6 and 8 columns

Video recordings are marked in the navigation bar by a video camera symbol, which allows a better distinction between normal images and video sequences.



At a mouse click on a preview image, the image will be shown in a 1 x 1 grid in the working area.

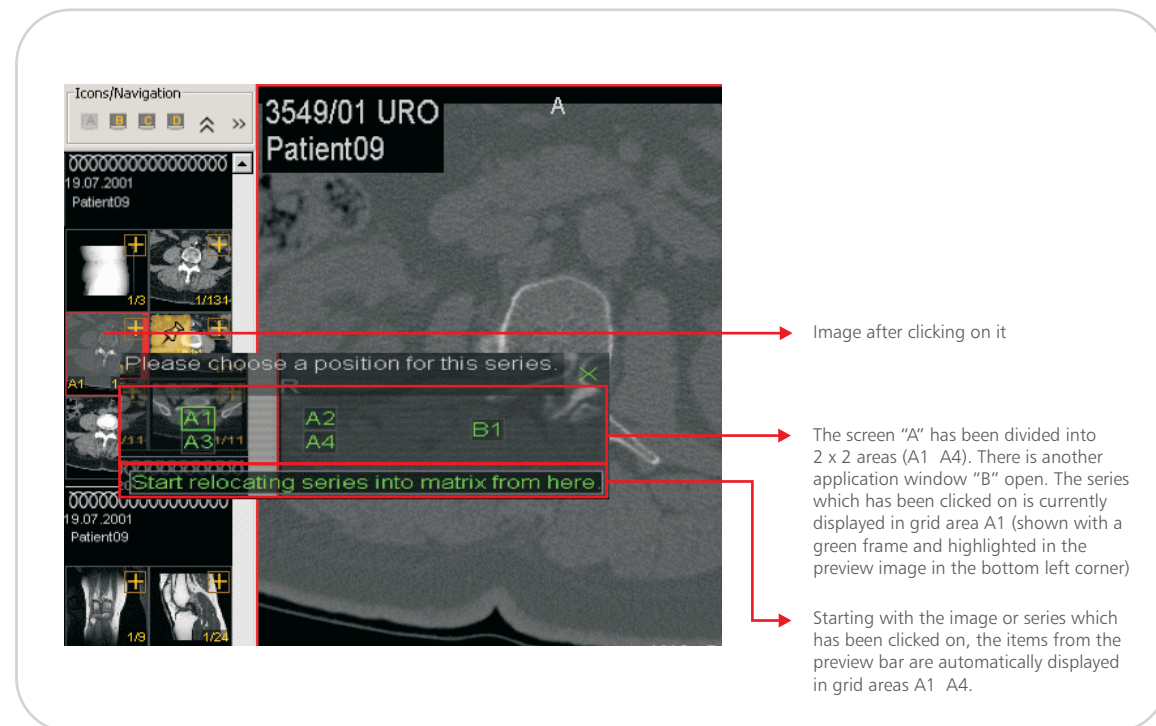
If the working area is already divided by a grid, e.g. 2 x 2, 4 x 5 or others, a click on a preview image or

series will produce a dialog box for choosing the grid area where it is to be displayed.

If more than one application window is open (see point 8.1.6.2 "Opening an additional window") the grid distribution of all open windows will be available to choose from. Thus it is very quick and easy to

display any image or series in the required grid area from any of the open application windows.

There is also an option to automatically display all images or series consecutively in all available grid areas, beginning with the image first clicked on.



When many images are loaded, the visible part of the navigation bar may be moved using the scroll bar or the mouse wheel.

The activated pick-up tool may also be used on the preview images. When picking up a series, all images are automatically selected or if the series is unfolded, also individual images of the series can be marked. The yellow Σ and the number following it indicate the total number of selected images in a series.

Individual slices of a series can be also marked, as the desired images are transferred first to a grid field of the working area. Then the series panel may be used to display the images separately and select them with the pick-up tool. Each selected slice will be allocated a serial number (in yellow). The total number of selected slices in the series is displayed in the corresponding preview image in turn.

All highlighted images are available for further actions, e.g. printing, exporting, saving on a patient CD, re-sorting or similar.

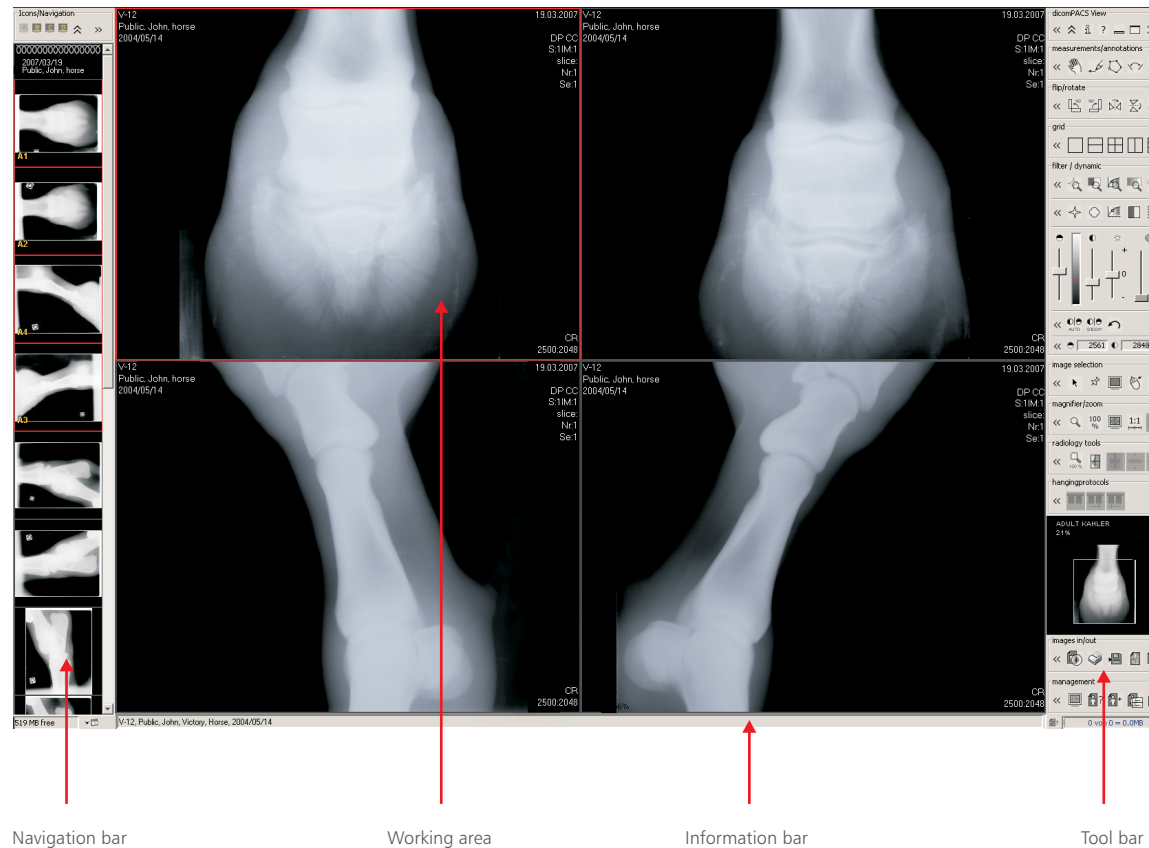
The image shows a vertical navigation bar on the left and a settings menu on the right. The navigation bar displays patient information (19.07.2001, Patient09), a 'findings' section, and a grid of image thumbnails. Some thumbnails are marked with a yellow Σ and a number (e.g., 1/13, 1/11, 1/8, 1/24). The settings menu, titled 'Icons/Navigation', contains several options with checkboxes and input fields:

- navigationbar on/off
- activates display A
- activates display B
- activates display C
- activates display D

Red arrows point from the settings menu to the navigation bar and from the navigation bar to the settings menu, indicating the relationship between the two. The following table summarizes the annotations:

Annotation	Target in Image
Shows / hides the navigation bar to enlarge the working area	navigationbar on/off checkbox
Activates display A	activates display A checkbox
Activates display B	activates display B checkbox
Activates display C	activates display C checkbox
Activates display D	activates display D checkbox
Scroll bar for moving the visible area of the navigation bar.	Vertical scroll bar in the navigation bar
Position of the series in the grid and window (here: A1)	Thumbnail labeled 'A1' in the navigation bar
Study information: all following images or series down to the next study information belong to the same study. The study's date and the patient name are displayed. (Here: study of the patient Patient09, done on 19.07.2001) If findings are present to this patient, this is indicated in the navigation bar here. By clicking the "create a finding"-symbol opens the "create a finding"-dialog.	'findings' section in the navigation bar
Sum of all marked images of this series (here: 3)	Thumbnail with yellow Σ and '3' in the navigation bar
Marked image of a series	Thumbnail with yellow Σ and '2' in the navigation bar
Opens and switches to additional application windows. By clicking for example on "B", a new additional application window with the letter B is opened or it is switched to the already opened application window B.	Thumbnail with yellow 'B' in the navigation bar
Display area for further objects to be loaded.	Bottom area of the navigation bar

Screenshot of the Diagnostic Module Standard :



Recommended hardware:

- Processor: Pentium IV
For diagnosis of slices: Intel Pentium IV HT with 2,8 GHz, Intel Core Duo/Core 2 Duo or comparable AMD Dual Core processor
- At least 1 GByte RAM
For diagnosis of slices: at least 2 GByte RAM
- At least 40 GByte hard disk
- CD/DVD drive
- 100 MBit network card
- Graphics card: Resolution of at least 1280 x 1024 pixels in the True Color mode; for diagnosing special graphics cards must be used, depending on the resolution of the diagnosis monitor

Monitors:

A diagnostic monitor should satisfied the following requirements:

- DVI connection
- Resolution of at least 1,280 x 1,024 pixels
- special b/w monitors from 18,1" TFT with high luminance
- high fidelity of grey tones and optimal luminance distribution

A viewing monitor should satisfy the following requirements:

- VGA and/ or DVI connection
- Resolution of at least 1,280 x 1,024 pixels
- TFT-Color from 17" with high contrast ratio (450:1)
- high fidelity of grey tones and good luminance distribution

For diagnostic and viewing workstations we recommend the use of b/w monitors which satisfy the requirements of image display devices for medical use. All monitors must conform to the requirements of the IEC 61223-2-5:1994 and pass the acceptance and constancy test. The monitor casings should not have any bright or shiny parts.

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

