

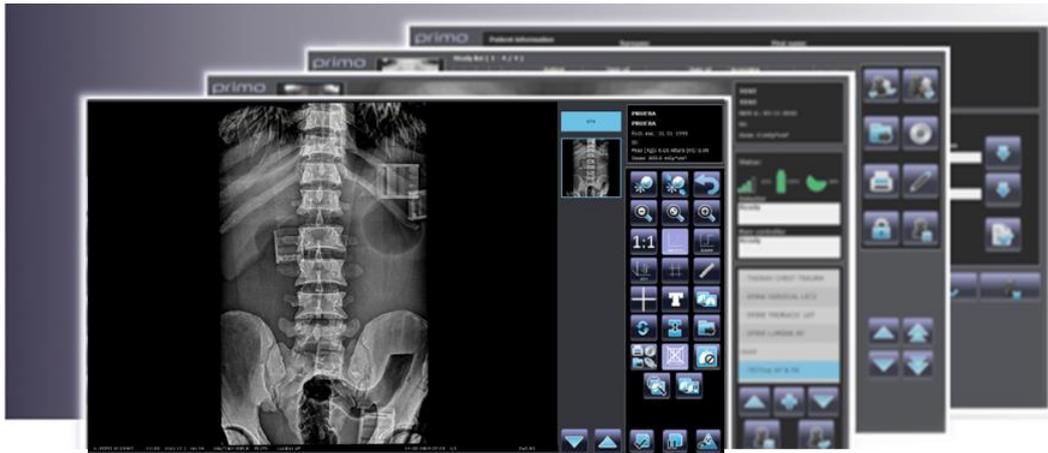
# PRIMO S

## TECHNICAL SPECIFICATIONS

### PRIMO S

### ACQUISITION SOFTWARE





1.1.73

1.1.7 PRIMO S intuitive X-ray image acquisition software for Digital detectors.

The intelligent tools for your digital radiography workflow.

- 1.1.7 ◦ Generator control and full integration of the radiographic parameters and dose values with patient data. 1.1.74
- Displays and records the values: Exposure Index values (EI), Deviation Index (DI) and DAP standard, which helps minimize patient dose by monitoring dose variations at each exposure (dose meter optional).
- 1.1.53 ◦ Excellent image quality and high consistency.
- Provides an efficient workflow by touching on the anatomical region of interest.
- Includes a wide range of precision tools that maximize the efficiency of the images, minimizing post-processing time and optimizing the time dedicated to the patient.
- DICOM connectivity allows to have an easy integration into digital hospital networks HIS/RIS and PACS, enabling access to digital laser printers, patient lists, files.

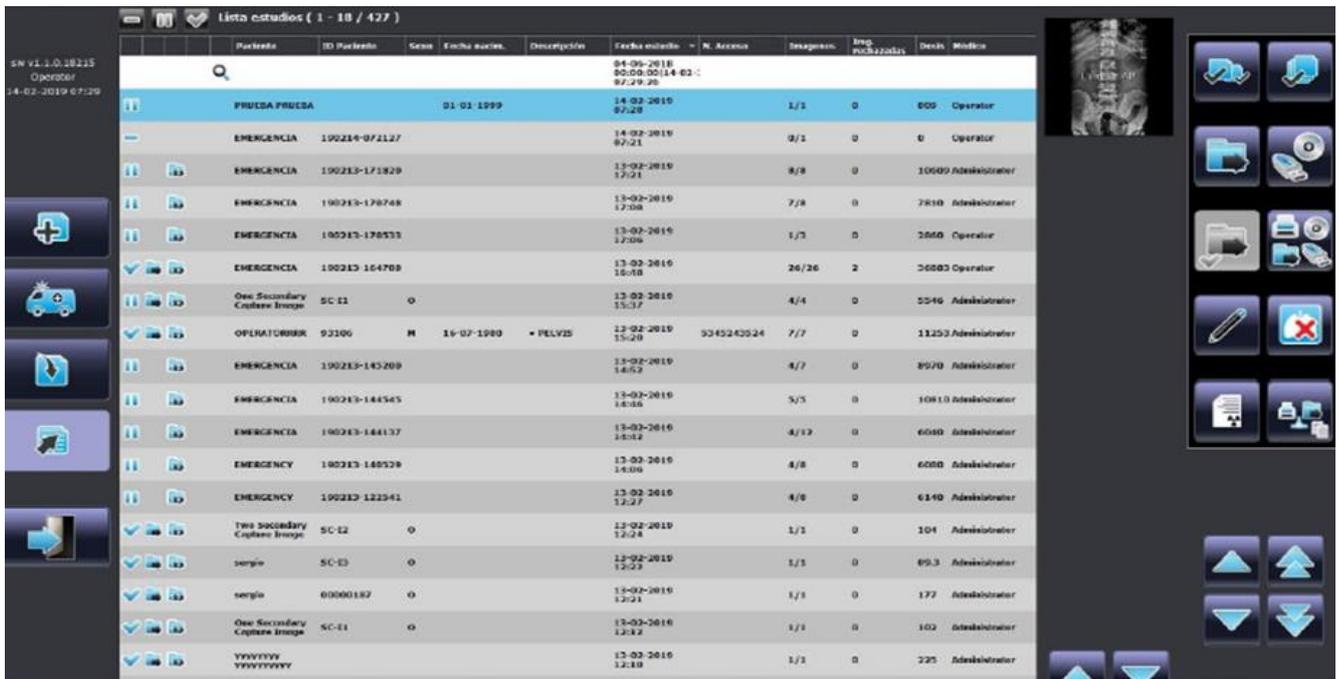
**BASIC FEATURES**

- 1.1.77 ◦ X-ray generator control with integration of all exposure parameters including dose measurement and alerts for overdose and/or low dose.
- 1.1.78 ◦ Integration with the RIS/PACS systems of the health centre for worklists management and images exportation to external servers.
- Patient registration from worklist, manual and emergency list
- Image processing with measurements, rotations, annotations, horizontal and vertical inversion, greyscale inversion, zooming, magnification, electronic collimation, printing, editing.
- Automatic image optimisation

**ADVANCED FEATURES**

- Tools for artefact removal or reduction, image optimisation, noise reduction and grid removal.
- Specific algorithms for image processing in every study.
- Management of statistics on performed studies with data inclusion: operator, patient type, exposure parameters, image rejections and causes, etc.
- Histogram Display.
- DVD/CD and USB recorder, recording studies with self-executing DICOM viewer.
- DICOM Procedure codes usage to transfer all patient information directly to the archive and control system (HIS/RIS).
- Image processing algorithms for each anatomical area.
- Image storage management, with auto-deletion rules and studies protection.

## WORKFLOW AND DATA ENTRY



Paciente	ID Paciente	Sexo	Fecha nactes	Descripcion	Fecha estudio	N. Acceso	Imagemen	Img. Pcs/220x35	Depto	Medico
PRUEBA PRUEBA			01-01-1999		14-02-2018 07:20		1/1	0	600	Operator
EMERGENCIA	190214-071127				14-02-2018 07:21		0/1	0	0	Operator
EMERGENCIA	190213-171829				13-02-2018 17:21		8/8	0	10000	Administrador
EMERGENCIA	190213-170748				13-02-2018 17:08		7/8	0	7810	Administrador
EMERGENCIA	190213-170533				13-02-2018 17:06		1/3	0	3600	Operator
EMERGENCIA	190213-164709				13-02-2018 16:58		26/26	2	36000	Operator
One Secondary Capture Image	SC-11	O			13-02-2018 15:37		4/4	0	5546	Administrador
OPERATORIO	93206	M	16-07-1980	• PELVIS	13-02-2018 15:20	3045242024	7/7	0	11253	Administrador
EMERGENCIA	190213-145209				13-02-2018 14:52		4/7	0	8570	Administrador
EMERGENCIA	190213-144545				13-02-2018 14:06		3/5	0	10810	Administrador
EMERGENCIA	190213-144137				13-02-2018 14:04		4/13	0	6080	Administrador
EMERGENCY	190213-140528				13-02-2018 14:06		4/8	0	6080	Administrador
EMERGENCY	190213-122341				13-02-2018 12:27		4/8	0	6140	Administrador
Two Secondary Capture Image	SC-12	O			12-02-2018 12:24		1/1	0	104	Administrador
sergio	SC-13	O			12-02-2018 12:23		1/1	0	89.3	Administrador
sergio	00000182	O			13-02-2018 12:21		1/1	0	177	Administrador
One Secondary Capture Image	SC-11	O			13-02-2018 12:12		1/1	0	102	Administrador
YYYYYY					13-02-2018 12:10		1/1	0	225	Administrador

**Remote registration:** patient data is sent from the worklist server, the operator has to select only the patient's name. If the RIS server sends the code of each procedure to be performed, the programme selection is carried out automatically avoiding this step to the operator.

**Local registration:** the operator can manually enter all patient data, select exam procedures and modify manually an open study from a remote registry

**Emergency patient registration:** The operator can later perform the complete registration with the actual patient data

## PATIENT CREATION

Possibility of Creating manually a new study:

- Last Name and First Name
- Patient ID
- Date of birth
- Weight & Height, sex
- Accession Number
- Technician and doctor
- Patient's notes, study description



## IMAGE ACQUISITION (APR)

The operator selects on the anatomical programmer the type of exposition to be performed. All exposure parameters of the X-ray generator and the subsequent imaging process are automatically selected without additional steps for the operator.

If the RIS server of the center sends procedure codes, the operator does not have to make the study type selection as this is done automatically with the patient's name.

- Head
- Chest
- Abdomen
- Cervical spine
- Pelvic measurement
- Humerus
- Femur
- AEC adjustment



Disposition of the Working Frame Information:

- Image area.
- Exam List / Preview List.
- Patient Data.
- Generator Console (X-ray parameters): Information about X-ray generator controls and parameters is shown in this area.
- Anatomical Region and exam selection. (APR).
- Exam Management Area: contains keys to delete, move or add procedure to your study, and to suspend or close the study.
- Messages area: This area contains indications of the detector connection status, the battery charge level, the amount of free space (%) on the archive disk and equipment status warnings and alarms.



## PROCEDURE TECHNIQUE

For an easy use is possible to set a Procedure to guide you through the performance of the exposures required for a study. Procedures define the exam/projection types needed for the study (defined during installation of the system).



## X RAY GENERATOR SETTING AND IMAGE ACQUISITION



1.1.76 1.1.6 The software is pre-programmed with exposure techniques that can be edited for each view. It allows the creation of unlimited new anatomical programmes.

- X-ray generator exposure techniques are differentiated by patient size: small, medium and large.
- If valid, the operator will accept the image and the software automatically loads the data for the next exposure of that patient. If the operator decides to repeat the exposure, he/she has the option of rejecting the previous one and the system will ask him/her to enter the cause of rejection (to be selected from a pre-set list or freely selectable). This information is recorded for subsequent use and dosimetry reports of the equipment.

## IMAGE PROCESSING



- A. . Previews / Exams List
- B. Image area and dose information
- C. Patient data

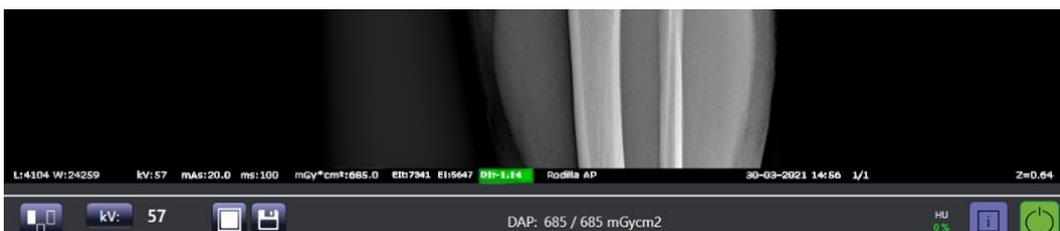
- D. Image Processing commands
- E. Study commands



- Patient's name
- Birth Date
- Patient ID
- Weight and height
- Total Dose

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Post-exposure control values per patient, including color-coded overdose exposure alerts:



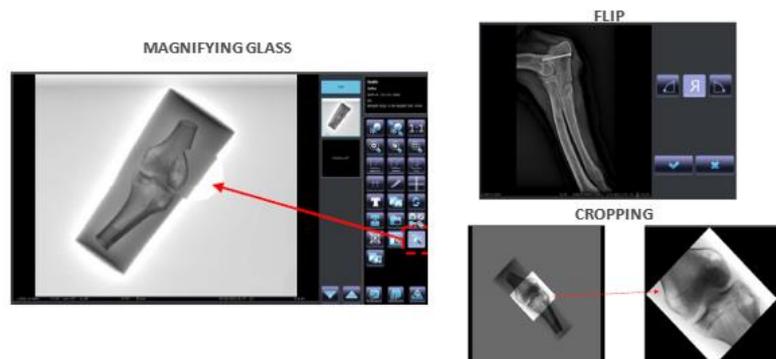
## IMAGE POST-PROCESSING

T3

- Logarithmic Image Processing (LIP): enhances bones contrast exposing subtle changes.
- Automatic Collimator Recognition: Our algorithm automatically recognizes the collimated area and display only the region of interest.
- Window and Level: the image greyscale is manipulated to highlight particular structures. Contrast and brightness correction.
- Spatial Filters (SF):
  - SMOOTH Filter: used for blurring and noise reduction in the image.
  - SHARP Filter: used to enhance the edges and adjust the contrast and the shade characteristics.
- Restore to original values.
- Digital Zoom Functions.
  - Image cropping.
  - True size or scale image.
- (ATH) Anatomical Tissue Harmonization Curves.
- LUT Curves.
- Measurements:
  - Calibration and linear measurements.
  - Angular measurements.
- Adding objects and text.
  - Rectangle.
  - Arrow.
  - Text.
- Image Multiview.
- Image orientation (Portrait /Landscape).
- Duplicate an image.
- Protect an image.
- Reject/Restore an image.
- Delete an imagen.
- Report tool:
  - Saving Images.
  - DICOM Print:
    - Add a new film.
    - Manual composition.
- Magnifying glass.
- Additional functions:
  - Transferring imágenes via DICOM:
    - DICOM STORES.
    - DICOM PRINT.
    - DICOM SPOOLER.
  - Saving images on (CD/DVD/USB).
- STATISTICS: The statistics function is used by the Technical Service when checking the system and so can only be accessed by the Advanced user.
  - It lets you find the co-ordinates and pixel values for the image.
  - Rectangle of a size set by the operator.
  - Raw image statistics (RAW).



All anatomical programmes have preprogrammed image processing values according to the Center requirements. However, the software allows the operator to manipulate the acquired images in an easy and intuitive way by means of visual tools.



## IMAGES RECORDS



The following DICOM functions can be used to produce image records:

**Export images to PENDRIVE or CD/DVD**



**Send images TO WORKSTATION/ PACS DICOM (Store DICOM)**



**Send images to DICOM printer**



**SPOOLER DICOM**



## STUDIES REPORT

The software incorporates a powerful reporting tool System with immediate on-screen information display or the possibility of a later analysis by exporting the report to a folder into the hard disk.



The exported data include the following information for each study:

- Acquisition date.
- Patient Surname and first name.
- Study image number.
- Image N° and % removed from the study
- Image N° and % rejected from the study.
- Image N° and % accepted from the study.
- The reasons why an image has been rejected.

## IMAGE QUALITY CONTROL TOOLS

The software allows the acquisition of images in "Raw" format (RAW) from the same user station. RAW images have a DICOM extension so they can be opened from external image control applications such as those specific to some quality control phantoms. Additionally, the verification of the images can be done from the application itself, as a complete module is available with the possibility of selecting ROIs and tools for measuring the average pixel value and noise.

## SYSTEM CONNECTIVITY

The acquisition station incorporates the following functionalities in accordance with the standard **DICOM 3.0**:

- 1.1.80 • Modality Worklist.
- Storage.
- Verification.
- Query/Retrieve.
- Modality Performed Procedure Step (MPPS).
- Grayscale Standard Display Function (GSDF).
- Basic Greyscale Print.
- Radiation Dose Structured Report (RDSR). 1.1.80
- 1.1.80 • Storage Commitment. 1.1.53

## GRIDLESS IMAGING. DIRECT EXPOSURE FREEDOM

T4 The software includes Dynamic Range Algorithm (DRC), a complex image processing technique which allows the detector to be used live without the need to incorporate a grid while maintaining high image quality:

- **Scatter Reduction:** corrects the effects of scattered radiation from the acquired image. This led to an improvement in both contrast and clarity of the image.
- **Edge Enhancement:** enhances the edge contrast of an image to improve its acutance (apparent sharpness).
- **Adaptative Contrast Enhancement:** the contrast of the image, or the difference in light between parts of it, is modified adaptative by this algorithm to improve its perception by human eye.

WITHOUT SCATTER CORRECTION



WITH SCATTER CORRECTION