Since 1990 the activities of BioScan Switzerland focus on biomedical X-ray imaging and non destructive testing (NDT). BioScan designs, manufactures and commercializes really new products using cutting-edge technology.

PIXRAY

CE 0120

FILMLESS REAL-TIME LOW DOSE DIGITAL X-RAY IMAGING SYSTEM FOR MEDICAL DIAGNOSIS AND INTERVENTIONAL RADIOLOGY.

1. PIXRAY (Picturing X-RAY on line)

"Less radiation, more precision" – this challenge for BioScan has resulted in an X-ray imaging system, **PIXRAY,** for medical diagnosis and interventional radiology.

PIXRAY is a new generation filmless X-ray system.

POSSIBLE APPLICATIONS:

- Ø Radioscopy
- Ø Mammography
- Ø Neurosurgery
- Ø Casualty Department
- Ø Plaster room
- Ø Hand surgery
- Ø Craniofacial surgery
- Ø Angiography
- Ø Radiography, etc.

Hand in plaster : by changing the contrast setting, one can see, in a single X-ray shot, either the plaster and the soft tissues or the bones.

Image with a micro-focus X-ray generator of 5 µm and PIXRAY with a pitch of 50 µm.

NEW ! !

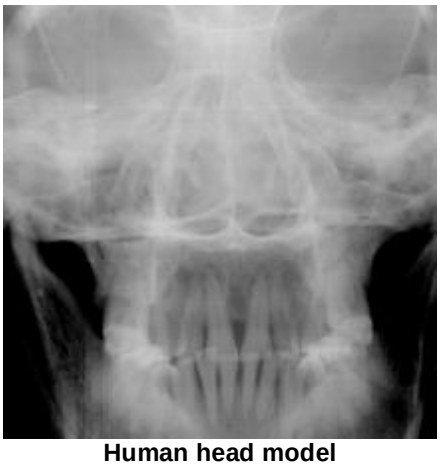
Very high resolution images, never seen until now.

BioScan launches a new generation system configuration presenting a micro-focus X-ray generator of 5 µm and a digital detector 12 cm x 12 cm which pixel size is of 50 µm x 50 µm.

BREAST MICROVISION – Early breast cancer detection
ANIMAL-VIEW – Portable digital X-ray equipment for veterinary applications
X-VIEW – Digital imaging and control system for NDT
PIXRAY – Low radiation, high contrast dynamic imaging system
IRIS – Dynamic imaging and monitoring system for radiotherapy

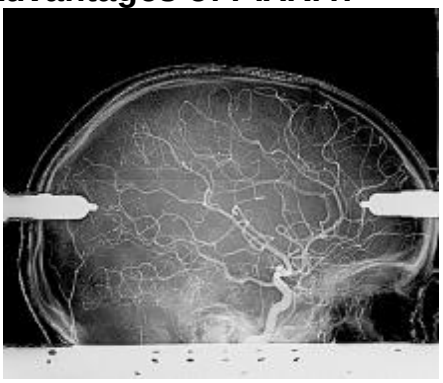
Rue du Pré-Bouvier 27 • CH-1217 Geneva, Switzerland • Tel. + 41 22 785 17 00 • Fax + 41 22 782 94 18 • E-mail: info@bioscan.ch • Internet : www.bioscan.ch

PIXRAY differs from conventional diagnosis devices by using a large area pixel matrix based on a solid state sensor for detecting X-rays. This technology ensures high detection efficiency, and consequently high image quality (spatial resolution and contrast) and lower radiation doses for the patients and the personnel compared to the film. Indeed, the delivered dose is 10 to 100 times lower compared to conventional film technique.

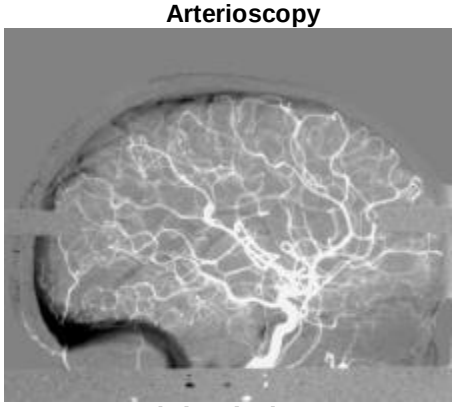


Human head model

2. Advantages of PIXRAY



Arterioscopy



with digital subtraction**.**

PIXRAY can be easily integrated in standard X-ray angiographic or radioscopic equipment.

Thanks to PIXRAY no consumables or development equipment are needed.

The images are visualized in real-time. PIXRAY produces up to 30 pictures per second with a wide dynamic range.

The use of PIXRAY significantly reduces doses, thus diminishing the risk of radiation injury during lengthy or repeated diagnosis and interventional procedures. The clinical importance of interventional procedures is growing, because they are less invasive than open surgery and they often require a shorter hospitalization period and consequently reduce expenses.

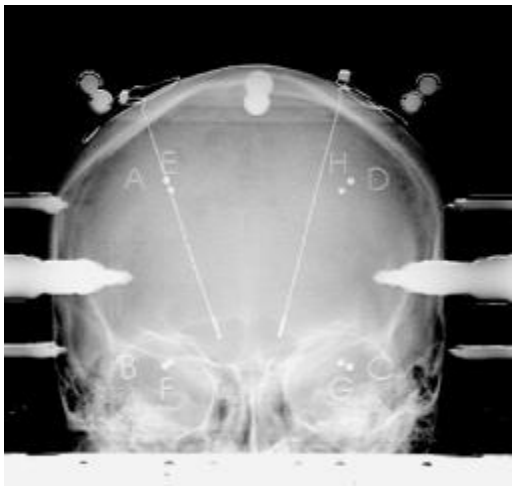
Standard radiology dose (44kV – 7mAs).

Dose 10 times lower (44kV - 0.7 mAs).

Dose 70 times lower (44kV - 0.1 mAs).

3. Medical Objectives

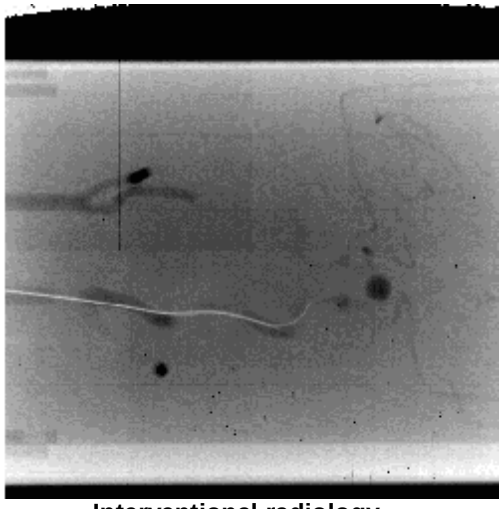
The variety of image-guided invasive procedures has grown substantially in the past decade. The development of minimally invasive therapy will result in further growth. At present, most interventional procedures are guided by means of X-ray fluoroscopy with an image intensifier and television viewing using analog data transfer. Film is still used as an image capture medium for substantial numbers of angiographic examinations. It is also used to document the results of interventional procedures.



Electrodes introduction in the treatment of Parkinson disease.

Dose and risk of radiation in interventional radiology

Interventional procedures can take a long time to perform even under the best conditions. Such procedures require substantial amounts of radiation if they can be done at all. The reappearance of radiation injuries such as hair loss after some neuro-radiological procedures, or skin burns has recently drawn the attention of the radiological community. After several decades of loss of interest in radioprotection matters by most radiologists, it appears now obvious that greater dose awareness and better risk-benefit evaluation for the individual patient are required.



Interventional radiology
Human vascular model with a standard catheter.

The potential risks of radiation exposure for patients undergoing lengthy interventional radiologic procedures depend on many factors, among which are the organ exposed, the age of the patient, the total delivered dose, the doses delivered during previous procedures and the time intervals between procedures. The organ at greatest risk for effects that may develop within weeks after the procedure is the skin. The lens of the eye may be at risk for cataract after about 1 year. The long-term risks of radiation-induced neoplasms in other organs are always a concern. Therefore, there is a great need for high sensitivity real-time imaging devices requiring low radiation doses to obtain images of good quality.

4. Technical Data

Main features of PIXRAY :

- **è Low dose rate,**
- **è Energy range : 20 keV – 400 keV,**
- **è Active area : 12 cm x 12 cm, 20 cm x 20 cm and 41 cm x 41 cm,**
- **è Pixel Size : from 400 µm x 400 µm down to 50 µm x 50 µm,**
- **è Frame rate : up to 30 frames per second,**
- **è ADC resolution : 16 bits (65536 grey levels),**
- **è Compact design.**

PIXRAY uses a large area pixel matrix based on a solid state amorphous silicon sensor. The detection matrix works as a complete electronic camera. It is much smaller and lighter than a conventional optical CCD camera with an image intensifier. Since this detector is tolerant to X-rays it can be placed directly in the beam.

Vertebrae.

Model PIXRAY-41

Model PIXRAY-20

Product range :

	PIXRAY-20	PIXRAY-41
Sensitive area	20 cm x 20 cm	41 cm x 41 cm
Pixel size	400 µm x 400 µm	400 µm x 400 µm
Resolution	512 x 512 pixels	1024 x 1024 pixels
Weight	9.5 kg	21 kg

- Personal computer or laptop,
- Monitor : 17" to 21" size,
- Maximal detector-computer distance : 100 m.

Computer configuration :

Personal computer with an Intel Pentium IV, PCI interface, 1024 MB SDRAM, hard disk 120 Go, graphic card SVGA 128 MB, Windows™ operating system, CD-ROM reader and writer, keyboard, mouse.

5. Dedicated Image Processing Software: PIX-View

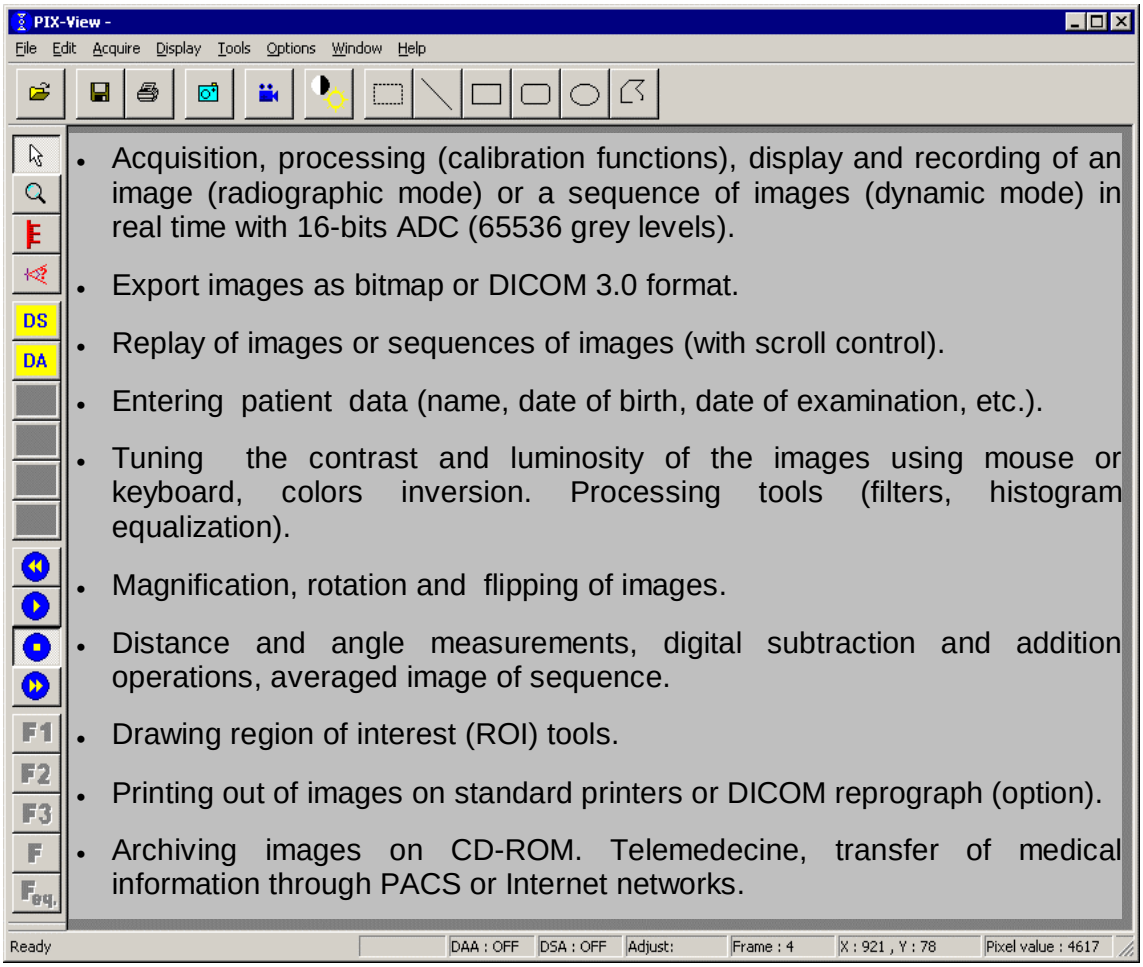
PIX-View is the software used for image acquisition and processing. It is specially conceived to take images, display and analyze them using PIXRAY systems in a clinical environment.

It is very easy to use and is primarily dedicated to radiologists and radiosurgeons.

PIX-View runs on a PC under Windows™ operating system. A dedicated frame grabber is used for data acquisition and I/O control of the detector.

Data is digitized with a 16-bit resolution (65536 grey levels). The input / output card uses a PCI bus for functions related to detector control and direct transfer of images in the PC memory. DMA (Direct Memory Access) ensures image acquisition without using the central memory of the PC. Thus, it is available for other control functions or image processing during data transfer, for instance - applying gain and offset corrections to the images on-line.

PIX-View performs the following main functions :



- Acquisition, processing (calibration functions), display and recording of an image (radiographic mode) or a sequence of images (dynamic mode) in real time with 16-bits ADC (65536 grey levels).
- Export images as bitmap or DICOM 3.0 format.
- Replay of images or sequences of images (with scroll control).
- Entering patient data (name, date of birth, date of examination, etc.).
- Tuning the contrast and luminosity of the images using mouse or keyboard, colors inversion. Processing tools (filters, histogram equalization).
- Magnification, rotation and flipping of images.
- Distance and angle measurements, digital subtraction and addition operations, averaged image of sequence.
- Drawing region of interest (ROI) tools.
- Printing out of images on standard printers or DICOM reprograph (option).
- Archiving images on CD-ROM. Telemedecine, transfer of medical information through PACS or Internet networks.