WORKING DOCUMENT ON CHEST X RAY EQUIPMENT FOR USE IN TB PREVALENCE SURVEYS

Prepared by
KNCV Tuberculosis Foundation
September 2008
Foreword

This document is a working document prepared to provide an overview of issues regarding chest X-ray equipment for use in TB prevalence surveys. The current information was collected by the research unit of KNCV Tuberculosis Foundation with input from external experts. A group of countries is preparing to carry out a TB prevalence survey in the coming years. When providing technical assistance for TB prevalence surveys we received questions from countries about chest X-ray equipment. Since there was no document with information available, we collected our own experience and experience from external experts.

The information is intended to provide an overview to guide the choice of X-ray equipment for a TB prevalence survey. It assembles information on the type of X-ray equipment used in previous surveys and intends to give an overview of the type of X-ray machines available for use in TB prevalence surveys. It also lists some experiences that countries had during their surveys with different types of machines. It is a working document and by no means a fixed document so it will be updated when additional information on other surveys becomes available. The provided information in the annex on the X-ray equipment available from different companies is by no means meant to be an advice for a specific brand of equipment but is an overview of the information that is currently known to us. When more information is available from other companies with similar equipment this can be added to the document. Additional information can be send to KNCV Tuberculosis Foundation (klinkenberge@kncvtbc.nl).

KNCV Tuberculosis Foundation
9 October 2008
FROM: Assessing tuberculosis prevalence through population based surveys (pages 26-28) by WHO 2007

Type of chest radiograph. For prevalence surveys, the full-size posteroanterior film is recommended. With each examination, the film must be correctly labelled with the survey number and must be of good quality.

X-ray reading. The film is ideally read by two independent readers. In case of discrepancy between the first two readers a third reading is obtained from an "umpire" reader.

5.2.3 Chest radiography equipment
In prevalence surveys, the X-ray unit is usually mounted onto a mobile van (vehicle) for radiological examination. Difficult terrain without passable roads may pose many problems for these units. In such cases, it may be possible to establish a centre to which all persons will be directed for X-ray. If some participants do not wish to take the time to have the examination, special arrangements must be made to transport these patients. Bringing back the films to the main centre for processing, arranging for independent reading, and preserving the films for future reference may also be difficult.

The use of chest X-rays is complicated by the high cost of the mobile chest X-ray equipment, logistical difficulties (accessibility of field sites by trucks, power supply, field robustness of the chest X-ray equipment, maintenance and repair), and the demands on human capacity, in particular the need for experienced clinicians in the field teams who can read chest X-rays.

Issues to consider when procuring chest X-ray equipment are the speed of operation (patient throughput and film development time), image quality, weight and size of equipment, power requirements, and safety (radiation dose). Three different types of chest X-ray systems are available: (1) mass miniature radiography; (2) conventional X-ray (with conventional or automated developing); and (3) digital X-ray (computed radiography, direct digital systems, or slot-scan systems).

Mass miniature radiography is no longer recommended since it has a large power requirement (three-phase, 30 kilowatt [kW] generator), gives significant radiation exposure to the patient, and produces low-quality images because of their small size. Fluoroscopy is not recommended for safety reasons. Furthermore, the lack of film complicates quality assurance.

Conventional chest X-ray systems with a conventional developer are relatively inexpensive ($30 000–$50 000); can be transported or built in a small truck; are simple, robust, and easy to operate; and can often be maintained locally. Such systems use a condenser system running on a 3 kW generator. However, operation and the developing process are slow and the quality of film development is critical—a serious disadvantage in TB prevalence surveys. Furthermore, the developing process needs conditioned temperature (32°C).

Conventional systems with an automated developer have advantages over conventional systems with a conventional developer. The developing process is faster and technical errors are less critical. Small developers are available for less
than $10,000. But these systems require calibration and maintenance, are still relatively slow, and have no instant quality check.

Conventional systems with a conventional developer or automated developer require transport of films for centralized rereading.

Digital X-ray systems are increasingly available for mobile use. They do away with the need for films, developing machines, and development solutions, and thus simplify the logistics. The X-ray images can be sent by Internet to a central place where they can be assessed by X-ray readers. In computed radiography, a phosphor plate is irradiated by a conventional chest X-ray system, and the phosphor image is converted into a digital image by a digital plate reader. Any conventional generator can be used, and the plates are reusable. There is no film developing and a quick quality check of the image is possible. Furthermore, the images are stored electronically and can be easily sent by Internet to a central place for rereading. Digital plate readers are relatively expensive ($30,000–$50,000), generally sensitive to dust and (probably) humidity, and large and must be transported by air-conditioned truck. But highly field-robust tabletop plate readers developed for military use have recently become available at reasonable cost. In completely digital systems the X-ray image is directly converted into a digital image by a transducer that takes the place of the image plate. There is no need for film developing or plate readers, and the image quality can be checked in real time. The transducers used are, however, expensive and highly sensitive to jarring. Mobile systems based on full-size transducers are therefore highly expensive (around $400,000) and vulnerable if transported over bumpy roads. Among other things, they require air suspension. The feasibility of using digital systems in prevalence surveys should still be assessed.

Slot-scan systems present an alternative that is increasingly being used in mobile X-ray. A small transducer moves in slots across the patient’s chest along with a narrow X-ray beam and the image is computed from the digital images for each slot. These systems have the same advantages as those with full-size transducers but are less vulnerable. Image quality depends on speed of scanning. The fastest scanners produce the best images but are also expensive (up to $500,000). Slow scanners are less expensive. Slot-scan systems, particularly the moving parts of the X-ray generator and the transducer, are still relatively vulnerable and repair often requires specific expertise.

Most mobile digital systems use battery-operated X-ray generators and have relatively low power requirements (two-phase, 10 kW generator for the system and air conditioning).

An important factor in deciding which chest X-ray system should be procured is the availability of service contracts in the country.
Chest x-rays used in TB prevalence surveys

Table 1 gives an overview of the type of machines used or planned to be used in different countries that are planning or have conducted a TB prevalence survey. More detailed documentation for each type of equipment is provided in the annexes.

The X-ray equipment consists of different parts:

1) **Car/Truck:** To make the equipment mobile in most cases X-ray equipment is installed in a truck with shielding that fulfils the requirements of the radiation board. The equipment can also be installed in a 20 feet container that can be transported on any truck. A third option is portable equipment transported in the back of a pick up that will be set up in locality.

2) **X-ray generator:** produces the X-ray beam, this can be digital or conventional

3) **X-ray imager:** makes an image out of the beam

4) **X-ray reader:** visualizes the image for reading by the radiologist. This can be digital or conventional. Digital systems can be linked to hard disks to store all the images. Images can be send elsewhere for reading or cross reading.

The following combinations are mostly distinguished

a) **conventional:** both X-ray generator and X-ray imager are conventional

b) **direct digital:** fully digital, both X-ray generator and X-ray imager are conventional

c) **indirect digital:** conventional X-ray generator and digital X-ray imager (computed radiography)

Most countries decided on X-ray equipment that was mounted onto trucks. In Vietnam they used a combination of 3 fully digital systems in a truck and 2 MMR systems. In the prevalence survey in Cambodia they used a combination of and X-ray car and portable equipment that can be mounted on the back of a pick up truck. Portable X-ray equipment is cheaper than a mobile X-ray truck but can not be used in all countries due to the radiation regulations in the countries overseen by the radiation board. Before a decision on which type of X-ray to use is made the radiation board needs to be consulted. They will also have to approve the truck to certify it fulfils the countries radiation requirements.

Apart from the X-ray equipment listed in table 1, there is a range of other companies that make equipment. Information of equipment of other companies has been added in the annex were available. The list is not complete and there will be other companies that produce comparable equipment but the presented information is intended to provide an overview of the type of equipment that is available.
<table>
<thead>
<tr>
<th>Country</th>
<th>Survey Status</th>
<th>Type</th>
<th>Equipment</th>
<th>Platform</th>
<th>Number of Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>Finished*</td>
<td>X-ray system built into truck</td>
<td>Pro-Scan 7000 integrated system built into Kamaz truck</td>
<td>Direct digital, slot scan, fully digital</td>
<td>3</td>
</tr>
<tr>
<td>Kenya–Nyanza</td>
<td>Finished*</td>
<td>X-ray system built into truck</td>
<td>X-ray: Practix 400, Philips with Bucky Diagnost VE - wall stand</td>
<td>Conventional generator (practix400 with bucky) with conventional developer (AGFA)</td>
<td>1</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Planned</td>
<td>X-ray system built into truck</td>
<td>Philips Eleva S plus practix 400 plus view forum assembled into truck</td>
<td>Indirect digital: Conventional X-ray generator (practix400) with computed radiography system for imaging (Eleva-S) and viewing forum</td>
<td>2</td>
</tr>
<tr>
<td>Cambodia/Myanmar</td>
<td>Finished</td>
<td>Portable equipment carried on back of a pick up</td>
<td>Portable X-ray Unit (PX-20HF with stationary stand (PS-1-III) both from Adore Medical Corporation with automatic X-ray film processor (EKOMAT 21 ELK Corp. Japan) and portable generator (EX28 HONDA Japan)</td>
<td>Conventional generator with conventional developer</td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>Ongoing – no X-ray used</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eritrea</td>
<td>Finished – no X-ray used</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* field data collection finished, official report of study being awaited
Table 1 notes:
1. Prices estimates per truck in the above ranged from 185,000-250,000 us dollars. For current budgeting an estimate of 250,000 usd per truck is recommended.
2. Prices can vary locally due to presence of company representatives and possibilities of providing in-country service. The best option should be assessed for each country.
3. Prices also depend largely of what is all included, i.e. plates, transport boxes, laptops for viewing etc. This should be well negotiated.
4. An extended viewer for definite diagnosis (higher resolution than workstation viewer in the truck) is definitely not standard included in the price and should be considered in addition.
5. A large part of the price consists of the price of the truck and prices of trucks vary. It is important the truck can access all the roads in the country and quality of the roads varies per country. Truck price depends on the need for 4-wheel or all-wheel drive, air suspension and of course availability of local made trucks.
6. In the negotiations with the companies the conditions of the service contract are very important, how fast can spare part be delivered, when is on the ground technical assistance provide, survey staff should be trained in use and maintenance of the equipment and basic repairs, if they can not repair it how fast will it be repaired or an alternative machines delivered if not possible to repair (a max time should be set for this) etc.
Field experience notes:

**Vietnam - Pro-Scan 7000:**
- Due to bumpy roads the moving part got stuck from time to time, for example the sliding door of the protective cabin and if this is not closed the machine does not work.
- There is need for second screen for reading of X-rays: The radiologist needs a separate viewing place to read the X-ray images apart from the technician. The technician needs to view each image to check if the image is taken ok or needs to be redone. This can be done with an additional laptop but this gave connectivity problems. Therefore the radiologist looked along over the shoulder of the technician which was not an optimal solution as there was some misinterpretation of images due to the angle along which the radiologist looked.
- The protective cabin did not fulfil the requirements of the radiation board and needed extra lead sheets.

**Kenya (Nyanza) - Philips Bucky Diagnost and Practix 400**
- Both are conventional, it would be better to use digital reader for the pictures to avoid having to use all the chemicals for developing the pictures in the field.
- Portable equipment was not possible in Kenya as this would mean the radiation board would have to come to each cluster after the equipment was set up to approve the installation. This is not feasible therefore the choice was made for a mobile truck.
How to choose?

The specifications that are important to take into account when choosing X-ray equipment are the following:

**X-ray generator:**
- speed of recharge of condenser as this determines the throughput
- robustness
- digital or conventional, both is possible
- size of generator needed
- size & weight (needs to fit in a truck)

**X-ray imaging system**
- output, should be sufficient to reach your targeted sample size per day → at least 40 pictures per hour
- robustness
- preferably digital to avoid need for chemicals

**Truck/transport system:**
- usable for all areas of the survey, all road types → 4 wheel/all wheel drive
- availability of spare parts
- weight should be suitable for weight of equipment
- size of body of truck to fit all equipment
- Depending on the type of equipment and the road condition in the country there might be a need for a truck with air suspension to reduce shocks for the equipment. Air suspended trucks are expensive and will considerably increase the cost.

**Power issues:**
- not all field sites will have reliable electricity therefore a generator is needed, the choice depends on the power requirements of the X-ray equipment but the generator needs to be movable and not too large otherwise a second truck will be needed to transport it.
- Some systems require a high KW and therefore a 3-phase current when using the power network and a large generator (up to 30 KW) if there is no reliable power supply. This is an important disadvantage since 3-phase may not be available in some clusters and large generators are expensive (buy or rent), bulky and consume lots of fuel. An indication of size & weight: a generator of up to 10 KW can be lifted relatively easily and has to size of a big suitcase, whereas a 30 KW generator is heavy and needs a separate trailer.

**Overall:**
- service contract

One of the most important specifications is the service contract provided with the equipment, what kind of training is offered on operating and maintaining the equipment, what assistance is given when a breakdown occurs, are spare parts available in the country, who pays when someone has to be flown in, what is the maximum time for repairs to be carried out and will a replacement machine be provided if repairs take longer etc.
Appendix 1 Philips Bucky Diagnost

Bucky Diagnost
VE/VT
BUCKY DIAGNOST SYSTEM

The compact, versatile and easy-to-use vertical Bucky

PHILIPS
Bucky Diagnost VE/VT – and your Bucky system is complete

The compact vertical Bucky systems are versatile and can be used for X-ray exposures of lungs, skulls and the skeleton of standing or seated patients. The vertical Bucky Diagnost VE (standard version) and Bucky Diagnost VT (tilting Bucky unit) are both extremely easy to handle and have a wide range of applications.

Ease-of-Use
The user-oriented arrangement of all control grips usually allows single-handed operation and guarantees fast, reliable work. All movements are counterbalanced and therefore easy to perform. Due to the easy-to-read angle indicator, the tilting vertical unit of the Bucky Diagnost VE may be comfortably positioned for all projections.

Wide range of applications
The large vertical field of movement of the Bucky units makes examinations possible from the head, to well below the knees – irrespective of the size of the patient. During exposures, the optional spacing device, between the column and the vertical Bucky unit, the Bucky Diagnost VE, allows more leg-rooms, to seat patient in comfort.

Sensing® (optional)
Automatic detection and convenient indication of the source-image distance (SID) and cassette size/colimated size on the display panel of the Bucky control grip makes it possible to work quickly and safely.

Tracking® (optional)
On the Bucky Diagnost VE/VT the tube assembly follows the Bucky. When the cassette is inserted in the center the radiation beam axis remains at the center of the cassette – if the cassette is inserted off-centre it remains opposite the top edge of the cassette (centre positioning). On the Bucky Diagnost VT the set SID remains constant when the 90° tilted Bucky is moved.

Advantages of the ACL4 Bucky (optional):
Motorised cassette loading, positioning centrally or off-centre at the top, inter-changeable grid or exposures without grid, motorised cassette ejection.

Technical data
Vertical Bucky Unit
Prepared for AMPLIMAT measuring chambers
Film formats (ISO 4090)
13 cm x 18 cm to 35 cm x 43 cm portrait and landscape
Cassette loading and operation
Available from the right or the left
Vertical movement 152 cm
152 cm: 38 cm to 190 cm midfilm-floor
Column measurements
Height: 224.0 cm (without arm rest)
Width: 65.0 cm (89 cm)
Depth: 42.5 cm (Bucky D, VE)®
62.5 cm (Bucky D, VE with Spacer)®
68.0 cm (Bucky D, VT)®
Positifioning of the column
Wall-mounted or free standing column
Tilt movement of the Bucky Diagnost VT
from -20° to +90°, locked-in position at 0°
Accessories (optional)
Arm rest and two side-mounted hand grips (one set), skull and hip supports, compression device, cassette holder as front attachment, bracket for floor mounting, spacer (spacing device between column and vertical unit on the Bucky Diagnost VE)

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Internet address: http://www.medical.philips.com

10
Appendix 2 Practice 400

Practix 400 Specifications

Practix — Mobile Radiography

All a Bucky station needs — plus mobility

Practix 400

Practix 400 meets the most demanding requirements of medical care, combining the virtues of mobile and stationary systems: unsurpassed image quality plus film saving, efficient working with Automatic Exposure Control (AEC). When used with a mobile Bucky table and vertical stand, Practix 400 becomes a mobile Bucky room.

PHILIPS
Mobility from head to toe

Even tubes within reach due to its geometry

**Easy handling and positioning**
The telescopic arm and rotatable column of the Practix 400 offer maximum freedom when positioning. The unit can be rotated and swivelled however needed. The Practix 400 has an extremely short wheelbase to guarantee optimum mobility.

**Applications**
Practic 400 from Philips is the only mobile system to use a peak power of 40 kW from a mains socket. Short exposure times offer the excellent image quality of stationary systems. The unit is particularly user-friendly and has 36 APR programs in order to facilitate and accelerate your specific routine settings. The APR programs can be individually adjusted and adapted to the particular needs of pediatrics as well as other types of applications.

**Options**
The Practix 400 can be combined with either the stationary automatic exposure control of the mobile Bucky table or the manual exposure control Mobil Aid, preventing over or underexposures. For maximum safety with regards to radiation protection, optional infrared remote control is offered. As with all members of the Practix family, the Practix 400 can be upgraded to digital by adding CR (Computed Radiography) cassettes, providing a lighter and more compact alternative to a digital flat detector.
# Technology

you can rely on

## Basic unit

<table>
<thead>
<tr>
<th>Type</th>
<th>Mobile X-ray unit with rotating column (±30°) and telescopic X-ray tube arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions in mm (L x W x H)</td>
<td>1120 x 617 x 1925 (44.13&quot; x 24.11&quot; x 75.84&quot;)</td>
</tr>
<tr>
<td>Cassette storage</td>
<td>Radiation protected for up to 10 cassettes (43 cm x 43 cm)</td>
</tr>
<tr>
<td>Source-floor distance</td>
<td>79 cm to 200 cm</td>
</tr>
<tr>
<td>Weight</td>
<td>290 kg (639 lbs)</td>
</tr>
</tbody>
</table>

## Generator

<table>
<thead>
<tr>
<th>Type</th>
<th>High-power X-ray generator (100 kV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak power</td>
<td>40 kW (100 kV / 20 ms) at 230 V / 115 V (main voltage)</td>
</tr>
<tr>
<td>Nominal power</td>
<td>30 kW (100 kV / 100 ms) at 230 V / 115 V (main voltage)</td>
</tr>
<tr>
<td>Tube voltage</td>
<td>40 kV to 125 kV in 1 kV steps</td>
</tr>
<tr>
<td>Maximum current</td>
<td>480 mA</td>
</tr>
<tr>
<td>Tube current time product:</td>
<td></td>
</tr>
<tr>
<td>– large focal spot</td>
<td>0.1 mAs to 120 mAs</td>
</tr>
<tr>
<td>– small focal spot</td>
<td>0.1 mAs to 100 mAs</td>
</tr>
<tr>
<td>Mains supply</td>
<td>115 V ±10%, 230 V ±10%, single-phase, 50 Hz (60 Hz)</td>
</tr>
<tr>
<td>Mains fuse</td>
<td>15 A slow</td>
</tr>
<tr>
<td>Preparation time</td>
<td>≤1 s</td>
</tr>
<tr>
<td>Exposure times</td>
<td>1 ms to 5.3 s; Safety shutdown if limit time of 5.3 s is exceeded</td>
</tr>
</tbody>
</table>

## X-ray tube

<table>
<thead>
<tr>
<th>Type</th>
<th>High-resolution rotating-anode X-ray tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Tungsten, Rhodium and Molybdenum</td>
</tr>
<tr>
<td>Nominal focal spot</td>
<td>0.6 / 1.5 or 0.6 / 1.2 (option)</td>
</tr>
<tr>
<td>Anode angle</td>
<td>14°</td>
</tr>
<tr>
<td>Maximum radiation field</td>
<td>43 cm x 43 cm</td>
</tr>
</tbody>
</table>

## Options

- Dose area product measurement (DAP) View
- Remote control
- Pediatric filters
- Mobil Aid (AEC) – connection to standard Amplimat chamber in Bucky table
- Adaption Amplimat (AEC)
- Mobile Bucky patient table with Amplimat
The **dimensions**

of maneuverability

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**All dimensions in mm**

- Break lever can be released permanently to easily manage long distances.
- Automatic exposure control using the MoTei Aid.
- User interface for full system control including all options.
- Digitalization via Philips Computed Radiography.
Easy positioning between beds

Full functionality of a stationary Buddy system in combination with the mobile patient table

Even within reach from the bed's foot end

Due to its geometry with rotatable column and swiveling telescopic tube arm, both beds are easily accessible without the need to reposition the basic system.
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Appendix 3 AGFA CP1000 processor

CP1000 processor
The CP1000 is an easy-to-use automatic film processor. Its compact size and light weight make it easy to handle.
It has automatic temperature control and drying, produces no waste water and, above all, it comes at the right price.

External replenishment kit
If you are a "larger" client, you can resort to the external replenishment kit to replace the set of 61 replenisher bottles which sometimes appears to be insufficient. Using the external replenishment kit, you can connect the CP1000 to bigger replenisher tanks.
## CP 1000

### Technical data

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Film sizes</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length with dryer: 94 cm (37 in)</td>
<td>Smallest size: 10 x 10 cm</td>
<td>120 V AC/60 Hz</td>
</tr>
<tr>
<td>Length with stacking tray out: 99 cm (39 in)</td>
<td>Largest film width: 36 cm</td>
<td>230 V AC/50 Hz</td>
</tr>
<tr>
<td>Width: 65 cm (25.5 in)</td>
<td>No roll film</td>
<td>220 V AC/60 Hz</td>
</tr>
<tr>
<td>Height: 55 cm (22 in)</td>
<td>Film transport speed: 28 cm/min</td>
<td>Max. consumption: 1100 W</td>
</tr>
<tr>
<td>Weight</td>
<td>Types of film</td>
<td>Continuous consumption: 400 W</td>
</tr>
<tr>
<td>Empty: 66 kg (146 lbs)</td>
<td>All types of medical X-ray film, which are suitable for rapid processing</td>
<td>Design features</td>
</tr>
<tr>
<td>Ready for use: 77 kg (170 lbs)</td>
<td></td>
<td>Compliance with VDE 0730-0720</td>
</tr>
<tr>
<td>Tank capacity</td>
<td>Accessories</td>
<td>suppressed in accordance with VDE 0075</td>
</tr>
<tr>
<td>Developer tank: 0.9 l (0.2 gal)</td>
<td>Light-tight cover</td>
<td>Noise level</td>
</tr>
<tr>
<td>Fixer tank: 0.9 l</td>
<td>Fixed water connection</td>
<td>&lt; 60 dB</td>
</tr>
<tr>
<td>Wash tank: 0.9 l</td>
<td>Support table</td>
<td>Safety</td>
</tr>
<tr>
<td>Replenisher bottles: 5 l each (1.3 gal)</td>
<td>External replenishment kit</td>
<td>This processor complies with the VDE, UL, and CSA safety regulations and with the VDE regulations on radio interference suppression. The non-return water connection complies with the DIN standard for connection to drinking water systems of the DVGW. The unit is supplied with the GS label.</td>
</tr>
<tr>
<td>Output</td>
<td>Recommended chemicals</td>
<td></td>
</tr>
<tr>
<td>Max. 60 films per hour (films of different sizes)</td>
<td>Developer: G153</td>
<td></td>
</tr>
<tr>
<td>Processing cycle</td>
<td>Fixer: G353 / G354</td>
<td></td>
</tr>
<tr>
<td>125 seconds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Not all optional products mentioned in this data sheet are available in all countries. In case of doubt, please contact your Agfa Sales Organisation.

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18
Appendix 4 Philips Elvira

Experience workflow in full bloom

PCR Eleva S, PCR Eleva S Plus functional descriptions

With PCR Eleva systems you can digitalize your conventional X-ray rooms. Each of the PCR Eleva workspots can be used for a wide range of applications:

- Intensive care units where free exposure techniques and fast image transmission are required
- Trauma departments where fast and simple operations and initial on-screen findings are required due to time constraints
- Orthopedics where long image formats are required
- General X-ray with its wide range of projections and diagnostic requirements
- Dental applications.
PCR Eleva

PCR Eleva supports automated one-touch workflows. All stages, including image export to PACS or a printer, are totally streamlined and adapted to the way you work. In the Eleva concept, the information from the Radiology Information System (RIS) is used to automatically program the right Eleva pre-sets, such as for processing, printing and export, to ensure maximum efficiency. The processed image is quickly available. Image export and printing can be fully automated or performed on completion of the examination. Manual interaction is possible at any stage. Thanks to its intuitive touch-screen user interface, PCR Eleva supports easy navigation and smooth working procedures. This allows technologists to spend a maximum amount of time caring for patients.

PCR Eleva systems offer complete integration into your hospital network with a RIS interface and DICOM communication.

PCR Eleva systems can be used with all existing X-ray equipment; no modification is necessary. The imaging plate cassettes are used in the same way as conventional film-screen cassettes.

PCR Eleva systems offer:
- RIS connection (Option)
- DICOM functions:
  - DICOM WLM (Option)
  - DICOM MPPS (Option)
  - DICOM GSDF
  - DICOM Print (Option)
  - DICOM Image Export (Option)
- Touch or non-touch screen LCD monitor
- UNIQUE image processing
- Eleva concept - workflow customization
- Viewing & image manipulation
- Move tool
- Reject analysis (Option)
- Reader sharing (Option)
- Multiple Eleva workspots (Option)
- Automatic image stitching (Option)
- DICOM Media (Option)
- iSite integration (Option)
- Vejoyon competence
- Special application cassettes (Accessories)
- Integrated virus scanner
- Extended security with mShield (Option)
- HIPAA compliance
- Quality Control Kit for Digital Radiography (Option).

RIS connection (Option)

PCR Eleva can be connected to a RIS for automatic updating of the patient worklist. PCR Eleva supports RIS connection through either DICOM Worklist Management (WLM) or an FTP interface. The examination information from the RIS is used by the Eleva concept to automatically program the right Eleva pre-sets for image processing, printing and export.

"with release 1.1"
Main features

DICOM functions
Please refer to the separate DICOM Conformance Statement for detailed information.

DICOM WLM (Worklist Management) (Option)
DICOM WLM supports communication between the RIS and the PCR Eleva modality, whereby the PCR Eleva automatically retrieves the worklist from the RIS. The worklist query can be performed on a "broad" (generic) or "specific" (patient oriented) basis.
You can carry out the worklist query automatically in the background ("broad") or interactively, on operator request ("broad" and "specific").

DICOM MPPS (Modality Performed Procedure Step) (Option)
DICOM MPPS serves to send examination data back from the PCR Eleva system to the RIS. In this way, the RIS server and the PACS are informed about start, end and examination content. The information sent back relates to the corresponding entries in the worklist:
- Patient and procedure data
- Number of exported DICOM images
- User comment on the Performed Procedure Step.

DICOM Grayscale Standard Display Function (GSDF)
With DICOM GSDF, PCR Eleva ensures consistent high-quality image display on both print-outs and PACS viewing monitors when exporting to DICOM imagers and PACS systems supporting the same function.
PCR Eleva displays images according to the GSDF, thus providing optimum consistency between quality control and reading situations.

DICOM Print (Option)
DICOM Print allows for manual and automatic printing directly from the Eleva workspace. It enables the user to transfer images to a networked DICOM imager with a choice of different printing modes:
- Autoprint:
  Automatic image printing on predefined film layouts according to the examination
- Manual print:
  Manual image placement on predefined film layouts or image placement on free layout composition.
The predefined film layouts can be changed and extended by the advanced user to meet individual needs.

DICOM Image Export (Option)
DICOM Image Export consists of two services:
- The DICOM Store service sends DICOM images to PACS or any other DICOM destination.
- The DICOM Storage Commit service enables the storage destination to inform PCR Eleva when images have been securely stored. This trigger is used by PCR Eleva to allow related images to be deleted.
Images can be stored manually and automatically within the Eleva concept.
Automatic export can be configured on an examination base to up to four destinations in parallel.

Touch or non-touch screen LCD monitor
You have the choice between two different monitors:
- 17'' LCD color touch screen monitor
- 17'' LCD color monitor (non-touch).

The convenient touch screen usage optimally supports the workflow with PCR Eleva's clear and powerful user interface, allowing maximum efficiency.
Both the touch and the non-touch screen monitors can be wall-mounted (option), therefore turning the PCR Eleva workspace into an optimal solution for space critical locations. PCR Eleva supports a virtual touch keyboard on the screen, so no keyboard device is necessary.

LCD color touch screen monitor
Main features

UNIQUE Image processing

PCR Eleva includes UNIQUE Philips advanced multi-resolution image processing software as standard. UNIQUE combines outstanding image dynamics with superb detail contrast. The processed images are instantly available at the Eleva workstation with a level of quality so similar to CR technology that it is hard to tell them apart. UNIQUE Image processing software:

- Harmonizes contrast,
- Enhances weak details to achieve exquisite detail in all areas,
- Eliminates virtually all processing artifacts,
- Permits a visually uniform impression for PCR Eleva and Digiscan/Diagnos exposures,
- Achieves consistently high image quality.

UNIQUE Image processing is ideal for both softcopy viewing and film printing. It offers a significant improvement in image quality while preserving the images’ natural appearance. Of course, all parameters can easily be customized to suit individual preferences. Please also see our additional information material about UNIQUE.

Eleva concept = workflow customization

PCR Eleva adapts to the way you work. The Eleva concept simplifies and customizes your workflow according to your specific requirements. The examination information from the RIS is used to automatically program the right Eleva pre-sets, such as for exam-specific processing, printing and image export. All these pre-sets can be individually customized to your department's requirements. Plus, the automation of the workflow procedures (auto shuttering, auto rotation, auto mirror, auto export, auto stitching, auto print) ensures "one-touch workflows" for maximized efficiency.

Viewing and Image manipulation

After the plate reader, the UNIQUE processed image is available within seconds for verification of on-screen findings. The operator can, in addition, use a wide range of parameters to further enhance the image:

- Contrast / Brightness
- Rotation / Mirror
- Annotation (URL, user defined, free text)
- Shutter
- Zoom and pan
- Segments and angles measurements
- Re-processing.

Move tool

If the technologist mixes up cassettes or views when linking cassettes to a patient at the Eleva workstation, this can result in an image being associated to a wrong patient or view. This mistake can be easily corrected using the clipboard function of the move image tool.

In this way, patient X's Chest AP which is in reality his Chest lateral can be corrected, together with all image information, allowing it to be archived or printed with the correct patient and image information as well as the optimal image processing.

Reject analysis (Option)

This convenient image statistic tool provides the advanced user with the functionality to analyze rejected images in terms of operators and rejection reasons. It also serves to monitor and analyze general parameters. The data files can be downloaded for further use or archived on a standard PC.

It supports both the quality standards of the department and teaching situations perfectly.

* with release 1.1

Multiple Eleva workstations
Reader sharing (Option)
Reader sharing means that one PCR Eleva reader is connected with other PCR Eleva readers in a network for increased workflow flexibility. The operator can use any free reader slot in the network and the image which has been read out will be displayed at the Eleva workspot where the cassette was initially barcoded. Different PCR Eleva readers (single- or multi-slot) can be shared in such a network. This kind of multi-reader setup provides an excellent backup solution.

Multiple Eleva workspots (Option)
One PCR Eleva reader can connect up to 8 PCR Eleva workspots. The workspots can be placed in the department as required for an optimized workflow, e.g., in each X-ray room. Each workspot will work independently of the others, providing the technologist with all the functionality necessary for performing the entire examination.

Automatic image stitching (Option) *
This advanced option is needed when using the long orthopedic cassettes. Using such cassettes, with one exposure, the complete required anatomy for long leg or full spine images is captured on 2 or 3 (dependent on cassette size) imaging plates. PCR Eleva optimizes the workflow by automatically and quickly stitching together the images in the background after cassette reading. The resulting single image is quickly available for review, validation, distance/angle measurements, export or print. This option includes also the Cobb's angle measurement.

DICOM Media (Option) *
This option offers the possibility of writing CDs directly on the PCR Eleva workspots. Each burned CD complies with the DICOM Media Interchange format and includes a stand-alone Phillips DICOM viewer to review the CD content on any standard PC.

iSite integration (Option) *
This option allows access to Philips' iSite PACS directly on PCR Eleva workspots. This is particularly interesting in terms of workflow improvement as PCR Eleva workspot users can use this to review previous examinations of a patient, or even display images of other modalities, without leaving the PCR Eleva workspot.

Vequion competent
PCR Eleva systems are Vequion-competent. Vequion is the Philips' strategy for next generation healthcare products, solutions and professional services. Vequion offers users a customized information management experience that aids confident and faster diagnosis and makes work more gratifying. Vequion-competent systems are customizable, they allow a fluid flow of information with seamless integration into the hospital network. They are based on open and standard technology and are future-safe.

* with release 1.1
Main features

Special application cassettes (Accessories)
Philips offers a wide range of cassettes for general radiography and special applications like orthopedics or dental (S and S Plus readers). PCR E1va offers long cassettes from 24 cm x 57 cm (10" x 23") to 35 cm x 124 cm (14" x 49"). All long cassettes contain two or three imaging plates and can be read directly by the PCR cassette reader. The global long image is automatically reconstructed using the automatic image stitching option.

Integrated virus scanner
Each PCR E1va workspot includes McAfee Antivirus software. This program can be activated to permanently check for infections in the background and immediately notify the user in case of attack. Virus definition updates are performed through the service channel.

For maximum IT security, active protection using Philips' optional mShield dedicated firewall is recommended.

Extended security with mShield (Option)
Philips' mShield is part of an overall strategy to safeguard the data integrity of medical information systems. It protects Philips' modalities from malicious attacks.

By restricting traffic to authorized devices only, mShield acts to prevent malicious activity directed from the modality to unrelated devices on your hospital network. Network communication can be restricted to DICOM communication and remote service only. Thereby, the channels required by hackers to spread attacks or viruses become unavailable. Please also see our additional information material about mShield.

HIPAA compliance
Philips has taken many steps to enhance the security of medical devices in response to customer requests. When used properly, the security features of Philips' products make it easier for users to meet their obligations to ensure the confidentiality, integrity, and availability of patients' health information.

In light of the increased focus on medical device security and compliance with the HIPAA Security Rule in the USA, the Health Information Management Systems Society (HIMSS; www.himss.org) has created a standard "Manufacturer Disclosure Statement for Medical Device Security" (MDS2). The aim of the MDS2 is to supply healthcare providers with important information that can assist them in assessing the vulnerabilities and risks associated with electronic Protected Health Information (ePHI) which is created, transmitted or maintained by medical devices.

Philips publishes these MDS2 forms for most supported Philips Medical Systems products including the PCR E1va Workspot. Philips MDS2 forms are available to customers and potential customers on the Internet at

www.medical.philips.com/us/productssecurity/mds2

Some relevant PCR E1va workspot security features include:
- Unique user identification & authentication mechanism (password protected access)
- Audit message generation for tracking access to patients' protected health information
- Operating system "hardening"
- Integrated antivirus software
- Hardware firewall (optional)

Quality Control Kit for Digital Radiography (Option)
This kit provides everything you need to control the quality of your digital X-ray system. Possible controls include dynamic range, contrast, homogeneity of the exposure and spatial resolution of the X-ray system.

The kit is composed of a test phantom, an aluminium attenuator, a support to mount on a cheat unit and the documentation, all in a convenient carrying case.
PCR Eleva S or PCR Eleva S Plus

PCR Eleva S
The PCR Eleva S is the smallest family member — smallest not only in terms of its size but also in terms of throughput. It is a compact, single-slot system which allows a throughput of 78 plates per hour or a cycle time of 46 seconds. PCR Eleva S is suitable in environments with moderate performance requirements, for private practices, a one-room solution with low CR throughput or as a backup reader.

The PCR S reader can read standard cassettes as well as orthopedic and dental cassettes.

For more information about the reader, please refer to the table on page 12.

"cassette size 18 cm x 24 cm.

PCR Eleva S Plus
The PCR Eleva S Plus system is a compact, single-slot system which allows a throughput of 97 plates per hour or a cycle time of 37 seconds. PCR Eleva S Plus is suitable as a system for one normal throughput X-ray room or as one system for two low throughput X-ray rooms enabling good workflow and efficiency.

Compared to the PCR Eleva S, the S Plus has a 35% shorter cassette cycle time and will therefore also display the image more quickly. PCR Eleva S Plus is a must for customers with high performance requirements. In a multi-reader cluster solution, where each reader supports one X-ray room, and all Eleva workspots share the readers (Reader sharing option), the PCR Eleva S Plus guarantees high performance workflow.
The PCR S Plus reader can read standard cassettes as well as orthopedic and dental cassettes.

For more information about the reader, please refer to the table on page 14.

Functionality
Image plate reading process
After inserting the cassette into the reader, the barcode of the imaging plate is read by the internal barcode reader. This connects the clinical image from the plate to the patient, examination and specific view.
The reader removes the exposed plate from the cassette and the reading process starts according to the examination parameters. After that, the plate will be erased in order to ensure that no residual information remains on the imaging plate. As soon as the cassette is reloaded and released, the reading procedure is finished.

The cassettes have standard dimensions and can be used in any conventional X-ray system instead of the current film-screen cassettes.

Loading and releasing of the cassette inside the reader is done automatically.

During readout, the image is shown in parallel on the Eleva workspot for quick image display.
Possible department setups

Reader-per-room setup:
One PCR Eleva system for one X-ray room
Having one reader available for each examination room
will minimize walking distances for the technologists.
It gives each X-ray room complete, direct functionality.
The reader-per-room setup provides maximum
department throughput.
One PCR Eleva S Plus system for
two rooms
For two low throughput rooms or
examination rooms used at different times,
PCR Eleva S Plus with two Eleva workspots is
an economical solution.

Cluster of several PCR Eleva systems
You can cluster your PCR readers so that
they can be used from each workspot in the
cluster. This functionality is called "Reader
sharing". The clinical images will be shown on
the Eleva workspot which initiates the
examination and all other readers can serve
as alternate readouts or backups, offering
increased flexibility, maximum efficiency and
security.
PCR Eleva systems

PCR Eleva workspot
Computer-controlled workspot including:
• PC
• Keyboard and mouse
• Barcode scanner and holder
• Software.

The PCR Eleva workspot controls the entire system from the examination room. Several PCR Eleva workspots can be connected to one reader. The PCR Eleva workspot can be attached to the wall (wall-mount kit option).

<table>
<thead>
<tr>
<th>Type</th>
<th>The PCR Eleva S or PCR Eleva S Plus systems consist of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• A single-slot image plate reader (S or S Plus),</td>
</tr>
<tr>
<td></td>
<td>• One or more PCR Eleva workspots.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
<th>PCR Eleva workspot</th>
<th>Image plate reader</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PC</td>
<td>LCD monitor</td>
</tr>
<tr>
<td></td>
<td>touch screen</td>
<td>non-touch screen</td>
</tr>
<tr>
<td>Nominal power</td>
<td>0.2 kVA</td>
<td>0.05 kVA</td>
</tr>
<tr>
<td></td>
<td>0.05 kVA</td>
<td>0.05 kVA</td>
</tr>
<tr>
<td>Heat dissipation</td>
<td>140 W</td>
<td>50 W</td>
</tr>
<tr>
<td></td>
<td>40 W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 VA</td>
<td>290 VA</td>
</tr>
<tr>
<td></td>
<td>202 W</td>
<td>292 W</td>
</tr>
</tbody>
</table>

| Mains voltage / frequency | | |
|---------------------------|---------------------------|
| PC                        | 100 V to 127 V, 50 Hz / 60 Hz or |
|                           | 200 V to 240 V, 50 Hz / 60 Hz |
| Other components          | 100 V to 240 V, 50 Hz / 60 Hz |

<table>
<thead>
<tr>
<th>Ambient conditions</th>
<th>In operation</th>
<th>During storage and transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td>0 to 2134 m</td>
<td>0 to 2134 m</td>
</tr>
<tr>
<td>Temperature</td>
<td>+15°C to +30°C</td>
<td>0°C to +45°C</td>
</tr>
<tr>
<td>Rel. humidity</td>
<td>20% to 80%</td>
<td>8% to 90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compatibility, laser imager</th>
<th>Agfa, Kodak, Konica (DICOM connection)</th>
</tr>
</thead>
</table>

| Conformity | The digital radiography systems, PCR Eleva S and PCR Eleva S Plus, from Philips Medical Systems conform to the provisions of Medical Device Directive 93/42 EEC (93), meet the IEC standard, and are UL labeled and/or CSA certified. |
## PCR Eleva workspot

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard disk</td>
<td>≥80 GB for system software and for intermediate storage of raw and processed image data (up to 2000 images)</td>
</tr>
<tr>
<td>Monitor</td>
<td>Choice of:</td>
</tr>
<tr>
<td></td>
<td>- 17&quot; LCD color touch screen monitor (recommended for optimized workflow)</td>
</tr>
<tr>
<td></td>
<td>- 17&quot; LCD color monitor</td>
</tr>
<tr>
<td>RAM storage capacity</td>
<td>≥1.5 GB</td>
</tr>
<tr>
<td>Software</td>
<td>PCR Eleva software automatically controls the cassette readout process and provides full functionality for technologists to perform exams. Images are processed with UNIQUE and displayed, exported and printed according to user preferences. Workflow can be optimized with the use of a touch screen.</td>
</tr>
<tr>
<td>Image processing</td>
<td>UNIQUE multi-resolution image processing for images in DR quality</td>
</tr>
<tr>
<td>Patient data input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Hardware keyboard</td>
</tr>
<tr>
<td></td>
<td>- Software keyboard</td>
</tr>
<tr>
<td></td>
<td>- Barcode scanner</td>
</tr>
<tr>
<td></td>
<td>- RIS connection</td>
</tr>
<tr>
<td>Barcode scanner and holder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Barcoding cassettes with the patient and the examination data</td>
</tr>
<tr>
<td></td>
<td>- Reading patient data</td>
</tr>
<tr>
<td>Interfaces</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 2 serial interfaces</td>
</tr>
<tr>
<td></td>
<td>- Keyboard and mouse ports</td>
</tr>
<tr>
<td></td>
<td>- Ethernet 10 / 100 / 1000 Mbit/s</td>
</tr>
<tr>
<td></td>
<td>- Interface for a printer and</td>
</tr>
<tr>
<td></td>
<td>- 8 USB interfaces (6 at the back, 2 at the front)</td>
</tr>
<tr>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>- DICOM and Classic RIS connection (Worklist management)</td>
</tr>
<tr>
<td></td>
<td>- DICOM MPPS</td>
</tr>
<tr>
<td></td>
<td>- DICOM Image Export</td>
</tr>
<tr>
<td></td>
<td>- DICOM Print</td>
</tr>
<tr>
<td></td>
<td>- Automatic image stitching</td>
</tr>
<tr>
<td></td>
<td>- Reject analysis</td>
</tr>
<tr>
<td></td>
<td>- Reader sharing</td>
</tr>
<tr>
<td></td>
<td>- DICOM Media</td>
</tr>
<tr>
<td></td>
<td>- ISite Integration</td>
</tr>
<tr>
<td>Hardware</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 17&quot; LCD color touch screen</td>
</tr>
<tr>
<td></td>
<td>- 17&quot; LCD color monitor</td>
</tr>
<tr>
<td></td>
<td>- Additional PCR Eleva workspots can be placed in the department</td>
</tr>
<tr>
<td></td>
<td>- Wallmount kit for workspot</td>
</tr>
<tr>
<td></td>
<td>- mShield (network security)</td>
</tr>
</tbody>
</table>

*with release 1.1*
Image plate reader PCR Eleva S

Image plate reader PCR Eleva S

<table>
<thead>
<tr>
<th>Type</th>
<th>The image plate reader PCR Eleva S consists of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Cassette feeding unit for the cassette,</td>
</tr>
<tr>
<td></td>
<td>• Reader unit.</td>
</tr>
<tr>
<td>Plate throughput</td>
<td>Up to 78 plates/h (18 cm x 24 cm), see table on page 13</td>
</tr>
<tr>
<td>Cassette release</td>
<td>46 s to 75 s, depending on cassette size</td>
</tr>
<tr>
<td>Cassette feeding unit</td>
<td>• Removal of exposed imaging plate from the cassette</td>
</tr>
<tr>
<td></td>
<td>• Reading of the imaging plate (or cassette) barcode</td>
</tr>
<tr>
<td></td>
<td>• Transport of the exposed imaging plate to and from the reader unit</td>
</tr>
<tr>
<td></td>
<td>• Loading the cassette with the erased plate</td>
</tr>
<tr>
<td></td>
<td>• Release of newly loaded cassette</td>
</tr>
<tr>
<td>Reader unit</td>
<td></td>
</tr>
<tr>
<td>Scanning resolution</td>
<td>100 µm or 200 µm</td>
</tr>
<tr>
<td></td>
<td>(200 µm through software re-sizing)</td>
</tr>
<tr>
<td>Read function</td>
<td>12 bit analog/digital conversion of information</td>
</tr>
<tr>
<td>Erase function</td>
<td>Exposure-dependent erasure of residual information on the imaging plate using white light</td>
</tr>
</tbody>
</table>
### Characteristics of cassette formats for the PCR Eleva S system

<table>
<thead>
<tr>
<th>Cassette type</th>
<th>Resolution (pixel/mm)</th>
<th>Throughput (plates/h)</th>
<th>Cycle time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard cassettes</td>
<td>10</td>
<td>48</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>53</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Dental cassette</td>
<td>10</td>
<td>78</td>
<td>46</td>
</tr>
<tr>
<td>Orthopedic cassettes</td>
<td>10</td>
<td>59</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>76</td>
<td>47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cassette size</th>
<th>Cassette type</th>
<th>Pixel matrix</th>
<th>Resolution (pixel/mm)</th>
<th>Throughput (plates/h)</th>
<th>Cycle time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 cm x 43 cm</td>
<td>Standard</td>
<td>3520 x 4280</td>
<td>10</td>
<td>48</td>
<td>75</td>
</tr>
<tr>
<td>35 cm x 35 cm</td>
<td>Standard</td>
<td>3520 x 3520</td>
<td>10</td>
<td>53</td>
<td>67</td>
</tr>
<tr>
<td>24 cm x 30 cm</td>
<td>Standard</td>
<td>2364 x 2964</td>
<td>10</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>18 cm x 24 cm</td>
<td>Standard</td>
<td>1770 x 2370</td>
<td>10</td>
<td>78</td>
<td>46</td>
</tr>
<tr>
<td>10&quot; x 12&quot;</td>
<td>Standard</td>
<td>2505 x 3015</td>
<td>10</td>
<td>59</td>
<td>61</td>
</tr>
<tr>
<td>8&quot; x 10&quot;</td>
<td>Standard</td>
<td>2000 x 2510</td>
<td>10</td>
<td>76</td>
<td>47</td>
</tr>
<tr>
<td>15 cm x 30 cm</td>
<td>Dental</td>
<td>1464 x 2964</td>
<td>10</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>24 cm x 57 cm (2 plates 24 cm x 30 cm)</td>
<td>Orthopedics</td>
<td>2364 x 2964 a</td>
<td>10</td>
<td>60 a</td>
<td>60 a</td>
</tr>
<tr>
<td>35 cm x 84 cm (2 plates 35 cm x 43 cm)</td>
<td>Orthopedics</td>
<td>3520 x 4280 a</td>
<td>10</td>
<td>48 a</td>
<td>75 a</td>
</tr>
<tr>
<td>35 cm x 102 cm (3 plates 35 cm x 35 cm)</td>
<td>Orthopedics</td>
<td>3520 x 3520 a</td>
<td>10</td>
<td>53 a</td>
<td>67 a</td>
</tr>
<tr>
<td>35 cm x 124 cm (3 plates 35 cm x 3 cm)</td>
<td>Orthopedics</td>
<td>3520 x 4280 b</td>
<td>10</td>
<td>48 a</td>
<td>75 a</td>
</tr>
<tr>
<td>10&quot; x 23&quot; (2 plates 10&quot; x 12&quot;)</td>
<td>Orthopedics</td>
<td>2505 x 3015 a</td>
<td>10</td>
<td>59 a</td>
<td>61 a</td>
</tr>
</tbody>
</table>

a Per plate
a Throughput and cycle time are approximate measurements
Image plate reader PCR Eleva S Plus

<table>
<thead>
<tr>
<th>Image plate reader PCR Eleva S Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Plate throughput</strong></td>
</tr>
<tr>
<td><strong>Cassette release</strong></td>
</tr>
<tr>
<td><strong>Cassette feeding unit</strong></td>
</tr>
<tr>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Reader unit:</strong></td>
</tr>
<tr>
<td><strong>Scanning resolution</strong></td>
</tr>
<tr>
<td><strong>Read function</strong></td>
</tr>
<tr>
<td><strong>Erase function</strong></td>
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### Characteristics of cassette formats for the PCR Eleta S Plus system

<table>
<thead>
<tr>
<th>Cassette Type</th>
<th>Size</th>
<th>Resolution (pixel/mm)</th>
<th>Throughput (plates/h)</th>
<th>Cycle time (seconds)</th>
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<tr>
<td>Standard cassettes</td>
<td>35 cm x 43 cm</td>
<td>10</td>
<td>64</td>
<td>56</td>
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<tr>
<td></td>
<td>35 cm x 35 cm</td>
<td>5</td>
<td>87</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>24 cm x 30 cm</td>
<td>10</td>
<td>70</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>18 cm x 24 cm</td>
<td>5</td>
<td>94</td>
<td>38</td>
</tr>
<tr>
<td>Dental cassette</td>
<td>15 cm x 30 cm</td>
<td>10</td>
<td>78</td>
<td>46</td>
</tr>
<tr>
<td>Orthopedic cassettes</td>
<td>24 cm x 57 cm</td>
<td>10</td>
<td>76</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>35 cm x 84 cm</td>
<td>10</td>
<td>94</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>35 cm x 102 cm</td>
<td>10</td>
<td>78</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>35 cm x 124 cm</td>
<td>10</td>
<td>76</td>
<td>47</td>
</tr>
</tbody>
</table>

*35 cm x 43 cm: (14" x 17")
*35 cm x 35 cm: (14" x 14")
*24 cm x 30 cm: 10" x 12"
*18 cm x 24 cm: 8" x 10"
*15 cm x 30 cm
*24 cm x 57 cm: 10" x 23"
*35 cm x 84 cm: (14" x 33")
*35 cm x 102 cm: (14" x 40")
*35 cm x 124 cm: (14" x 43")

<table>
<thead>
<tr>
<th>Cassette size</th>
<th>Cassette type</th>
<th>Pixel matrix</th>
<th>Resolution (pixel/mm)</th>
<th>Throughput (plates/h)</th>
<th>Cycle time (seconds)</th>
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<tbody>
<tr>
<td>35 cm x 43 cm</td>
<td>Standard</td>
<td>3520 x 4280</td>
<td>10</td>
<td>64</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1760 x 2140 v</td>
<td>5</td>
<td>87</td>
<td>41</td>
</tr>
<tr>
<td>35 cm x 35 cm</td>
<td>Standard</td>
<td>3520 x 3520</td>
<td>10</td>
<td>70</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1760 x 1760 v</td>
<td>5</td>
<td>94</td>
<td>38</td>
</tr>
<tr>
<td>24 cm x 30 cm</td>
<td>Standard</td>
<td>2364 x 2964</td>
<td>10</td>
<td>78</td>
<td>46</td>
</tr>
<tr>
<td>18 cm x 24 cm</td>
<td>Standard</td>
<td>1770 x 2370</td>
<td>10</td>
<td>97</td>
<td>37</td>
</tr>
<tr>
<td>10&quot; x 12&quot;</td>
<td>Standard</td>
<td>2505 x 3015</td>
<td>10</td>
<td>76</td>
<td>47</td>
</tr>
<tr>
<td>8&quot; x 10&quot;</td>
<td>Standard</td>
<td>2000 x 2510</td>
<td>10</td>
<td>94</td>
<td>38</td>
</tr>
<tr>
<td>15 cm x 30 cm</td>
<td>Dental</td>
<td>1464 x 2964</td>
<td>10</td>
<td>78</td>
<td>46</td>
</tr>
<tr>
<td>24 cm x 57 cm</td>
<td>Orthopedics</td>
<td>2364 x 2964 v</td>
<td>10</td>
<td>78 v</td>
<td>46 v</td>
</tr>
<tr>
<td>(2 plates 24 cm x 30 cm)</td>
<td>Orthopedics</td>
<td>3520 x 4280 v</td>
<td>10</td>
<td>64 v</td>
<td>56 v</td>
</tr>
<tr>
<td>35 cm x 84 cm</td>
<td>Orthopedics</td>
<td>3520 x 3520 v</td>
<td>10</td>
<td>70 v</td>
<td>51 v</td>
</tr>
<tr>
<td>(2 plates 35 cm x 43 cm)</td>
<td>Orthopedics</td>
<td>3520 x 3520 v</td>
<td>10</td>
<td>64 v</td>
<td>56 v</td>
</tr>
<tr>
<td>35 cm x 102 cm</td>
<td>Orthopedics</td>
<td>3520 x 4280 v</td>
<td>10</td>
<td>64 v</td>
<td>56 v</td>
</tr>
<tr>
<td>(3 plates 35 cm x 35 cm)</td>
<td>Orthopedics</td>
<td>3520 x 4280 v</td>
<td>10</td>
<td>64 v</td>
<td>56 v</td>
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<tr>
<td>35 cm x 124 cm</td>
<td>Orthopedics</td>
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<td>76 v</td>
<td>47 v</td>
</tr>
<tr>
<td>(3 plates 35 cm x 43 cm)</td>
<td>Orthopedics</td>
<td>2505 x 3015 v</td>
<td>10</td>
<td>76 v</td>
<td>47 v</td>
</tr>
</tbody>
</table>

*High-speed mode available with PCR Eleta release 1.1

*Throughput and cycle time are approximate measurements

---

33
Dimensions

PC R Eleva S / PC R Eleva S Plus

PC R Eleva workspot:
• 17" LCD color touch / non-touch monitor
• PC

All dimensions in mm and inch

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch monitor</td>
<td>435</td>
<td>430</td>
<td>240</td>
</tr>
<tr>
<td>(17.14&quot;)</td>
<td>(16.94&quot;)</td>
<td>(9.46&quot;)</td>
<td></td>
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<tr>
<td>Non-touch monitor</td>
<td>362 cm</td>
<td>390 cm - 490 cm</td>
<td>205 cm</td>
</tr>
<tr>
<td>(14.26&quot;)</td>
<td>(15.37&quot; - 19.3&quot;)</td>
<td>(8.1&quot;)</td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>310 cm</td>
<td>85 cm</td>
<td>358 cm</td>
</tr>
<tr>
<td>(12.2&quot;)</td>
<td>(3.35&quot;)</td>
<td>(14.1&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

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Appendix 5 Kodak Orex ACL4

Low-dose digital scanning fluoroscope
ProScan-7000 • (DRAU-01- "AMICO")

To record X-rays that have been sent through the patient's body, fluoroscope ProScan-7000® applies a silicon line detector. The detector is about 550 mm long. For X-raying of lungs, the detector moves horizontally along the thorax, simultaneously with the fan-shaped beam that is formed by the slot diaphragm. To this end, both the detector and the slot diaphragm are fastened onto the rod rotating around the focal radiation spot on the anode. The rod is set in motion by a microstep motor.

The company has developed a new type of protective cabin made of up-to-date composite materials. The protective cabin reduces X-ray exposure of the personnel and so can safely be placed close to the doctor's workplace, even in closed areas such as mobile fluoroscopic vans.

The X-ray tube with the focus 0.3 mm is energized by a medium frequency X-ray generator.

The fluorograph includes two workbenches – the radiologist's WB and the assistant's WB. The radiologist runs the fluoroscope from the 17" console on the basis of a PC with a touch screen. Easy-to-use "floating" menus allow to enter patient's data, adjust fluoroscope settings and control resulting X-ray images. The doctor's WB is supplied with a professional medical 20.3" TFT-monitor EIZO (Japan).

X-raying can go in two modes: prophylactic mode (that one is recommended for examining normal patients) and diagnostic mode. The prophylactic mode uses a considerably lower dose (about 200µR), smaller image dimensions (4-fold, which allows to save space on DVD) and the maximum possible image contrast. Spatial resolution in this case is reduced up to 2 pairs of lines per mm. In case of lesion detection during prophylaxis, the doctor is recommended to switch over to the diagnostic mode and take the required number of images.

The software used at both WB's allows to control the fluoroscope and process the images received from ProScan. For archiving X-ray images, digital video disks
(DVD's) are used with the capacity 3,500 images each. If necessary, a hard copy can be printed on a professional medical printer - both on paper or a film. For printing out periodic reports, an office laser printer is also supplied. The performance of the fluoroscope is demonstrated in the Video clip showing performance of the digital fluoroscope ProScan-7000® (11,6 Mb).

Advantages of ProScan-7000®

- **The silicon linear detector** does not require any maintenance. The spatial resolution in the patient's plane is 3.2 pairs of lines per mm and contrast sensitivity not less than 1%. High detective efficiency allows to obtain a direct image at the low dose of 400 µR.

- **The protective cabin** with the absorption coefficient equivalent to 1.2 mm lead shield reduces X-ray exposure of the personnel practically to the natural background level.

- **The medium frequency X-ray generator ** "AMICO" can be connected to one-phase mains at 220 V ± 10% and resistance up to 1 Ohm. Most available fluoroscopes require three-phase mains at 380 V ± 10% with resistance no more than 0.3 Ohm.

- **Complete equipment of the radiologist's and assistant's WB's.** This is a unique professional computer set that is characterized by efficient production and guarantees patients' examinations in maximally comfortable conditions.

- **The "ProScan" software** is in compliance with the international protocol DICOM-3.0, and so can, if necessary, be integrated into any medical information system. The program has been developed in close cooperation with radiologists; therefore apart from standard formalized protocols it also contains templates of periodic reports. The resources of the program as for image processing with special filters are practically unlimited. Images are archived onto the digital video discs with the capacity 4,700 Mb (about 1,000 images). For the time being, this is the most reliable way of data storage. The Demo version of ProScan is available to registered users of our website.
Here we present the most recent product of RentgenProm, a mobile digital fluoroscopic room that is mounted on chassis of motor vehicles ZIL-5301 EO "Bychok" and KAMAZ-43114. The chassis were not chosen at random: ZIL-5301 EO is an up-to-date motor vehicle with high characteristics and due comfort. "Bychok" had originally been developed for driving both in urban conditions and on earth roads in the countryside. It has a diesel engine, gasoline consumption being 12 litres / 100 km.

If the fluoroscopic room is to be used on earth roads, the best way out is to drive the landrover KAMAZ-43114. A modern van, it is characterized by excellent heat insulation and muffling properties. The rapid heating system allows to warm the van and the equipment thoroughly and start to work fast (about 30 min.) even when the atmospheric temperature outside the van is far below zero (up to -40°C).

High ceilings (2,16 m) and a convenient placement of the equipment make work comfortable throughout the day. Fluoroscope ProScan-2000® is placed at the front of the van. The entrance and the exit to the room are through 2 doors, which increases the capacity of the X-ray considerably. Up to three patients can simultaneously dress or undress in the medical room (1). For cold season, there is a heat curtain over each door. Every time when a patient is in the medical room, the bactericidal oscillator is working.

The room for the personnel is partitioned off the medical room with a transparent polycarbonate shield. The personnel room is supplied with:

- Radiologist’s workbench (2);
- Wardrobe;
- Drawer (4);
- Sofa;
- Air conditioning (3);
- Mini-fridge (over the AC).
Appendix 6 Kodak Orex ACL4

Rolling into Clinics, Imaging Centers and Hospitals Near You!

How it works
The Orex ACL4 combines laser scanner, erasable phosphor plates, advanced image management software and a PC-based review station in one compact affordable package.

Highly Versatile
The Orex ACL4 is configurable to meet most clinical applications. With its anatomical interface you can set the system up to capture high quality x-ray images of any body part. All of the imaging parameters are optimized resulting in digital images which can be enhanced, enlarged, duplicated and sent to any location in seconds as a DICON 3.0 file with no loss of resolution. Images can also be archived locally on CD, DVD or printed.

Mounted on an Orex Z-Cart or table top, the Orex ACL4 scanner can be deployed anywhere — hospital ER, OR, clinics, and imaging centers.

Orex ACL4 system in a field hospital in Afghanistan.
Point of Care Productivity

Mounted on an optional Orex Z-Cart or placed on a table top, the Orex ACL4 can be used in virtually any location. From hospitals, specialty practices such as chiropractors, podiatrists, orthopedists, off-shore, rural, mobile or highly remote medical facilities, the ACL4 can be rolled into any situation where nearly instant digital images are needed. Just plug it in and scan!

Military

With over 350 units deployed by military forces worldwide, the field proven Orex ACL4 scanner is ideal for remote places. The Orex ACL4 is portable, easy to setup and simple to operate, even in the most demanding conditions.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>ACL4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>THROUGHPUT (Cassettes per hour)</td>
<td>Up to 41</td>
<td></td>
</tr>
<tr>
<td>GRAYSCALE RESOLUTION (bits per pixel)</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>ACQUISITION DISPLAY</td>
<td>733 x 655 x 340 mm (29” x 26” x 14”)</td>
<td></td>
</tr>
<tr>
<td>WEIGHT</td>
<td>40 kg (88 lbs.)</td>
<td></td>
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<tr>
<td>SYSTEM CONFIGURATIONS</td>
<td>Desktop</td>
<td>Z-Cart (Integrated Mobile Cart)</td>
</tr>
<tr>
<td>SOFTWARE</td>
<td>DICOM Compliant Software</td>
<td>BMD Osteodensitometry (BMD osteodensitometry Software and cassette with template)</td>
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<tr>
<td>COMPUTER WORKSTATION MINIMUM REQUIREMENTS</td>
<td>Power Supply: Single phase 50-60 Hz, 200 VA, 100 A/C – 200 A/C (a 10%), UPS required</td>
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<tr>
<td>RESOLUTION</td>
<td>Cassette Size</td>
<td>8” x 10”</td>
</tr>
<tr>
<td>Pixel Matrix</td>
<td>2080 x 2560</td>
<td>2080 x 2450</td>
</tr>
<tr>
<td>Sampling Density</td>
<td>1,4 pixels/mm</td>
<td>0,7 pixels/mm</td>
</tr>
</tbody>
</table>

* Other sizes available by request.

Orex
A Kodak Company
www.orex-cr.com
Appendix 7 MINIXRAY digital imaging (Canon)

MINIXRAY INC.
DIGITAL IMAGING

CMDR-1S-MIL - A COMPLETE DEPLOYABLE DR RADIOGRAPHIC SYSTEM ON WHEELS

MINIXRAY’s CMDR-1S-MIL is a complete mobile direct digital radiography system. The system utilizes a Canon CXDI-50G imaging panel coupled with MINIXRAY’s PowerFlexTM portable x-ray unit as used by the US Armed Forces. The system is easily moved like a two wheel cart, the Canon panel clips out of its protective sleeve and the system sets up in less than one minute.
CMXR-1S-MIL/MinXray/Canon DR Radiograph System Military

MinXray's CMXR-1S is a complete mobile direct radiography system. The system utilizes a Canon CXDI-50G Imaging panel coupled with MinXray's PowerPlus™ portable x-ray unit, as used by the US Armed Forces. The system is easily moved like a two wheel cart. The Canon panel slips out of its protective sleeve. The system sets up in less than one minute. The system includes:

1 ea. CXDI-50G DR Plate
1 ea. CONTROL STATION FC24-VE 120V CS
1 ea. DR Grid 6:1 For CXDI-50G
1 ea. SOFTWARE MLT M, Acquisition Viewing Software
1 ea. CMXR-1S INSTALL KIT Installation Parts Kit
1 ea. HF120/6OHPVW PowerPlus™ High Frequency Portable X-Ray Unit
1 ea. XGSMKIVLW Gas Spring Portable Mobile Stand with 16" wheels
1 ea. LT COMPUTER Panasonic CF30
1 ea. CMXR-1S-MIL Hardigg Carrying Case

Canon DR System

Detector
Detector: Lanmil 4, Amorphous Silicon
Pixel Pitch: 160 x 160 microns
Pixels: 5.9 million
Imaging Area: 14" x 17"

Image Acquisition and Processing
Analog to Digital Conversion (A/D): 14-bit
Grayscale: 12-bit
Review Image: 3-5 seconds
Refresh cycle: 6-10 seconds
Total cycle time: 9-15 seconds

Data Output and Network Connection
Ethernet: 10/100/1000 Base T, RJ 45 standard, wireless (optional)
Data output: DICOM 3.0 Compliant, Print Management Service Class (SCU), Storage Service Class (SCU) and others

Electrical and Environmental
Voltage: 100-240 volts (50-60Hz)
Power Consumption: 200VA (detector only)
Operating environment: (detector only) 41-95 degrees F (5-36C) 30-75% RH (noncondensing)
Weight: 10.5 lb (detector only) Approximately 140 lb assembled with x-ray.

Canon DR System can be purchased separately.

*Specifications are subject to change without notice.
Annex 8 Odelca-DR unit

The concept offered by Delft allows “anyone to make a chest X-ray (CXR) image almost anywhere” and “(re)read the image wherever you have a trained reader”. Additionally dedicated TB viewer with Computer Aided Diagnose (CAD) (Work in Progress) will allow non formally trained radiographers/ radiologists to make a (first) diagnosis.

In practice, a self supporting unit in the field has the ability to make, store, and diagnose CXR’s. With rapidly expanding GSM networks around the world it is possible to sent these CXR’s from virtually any venue to a diagnostic centre, where these images are interpreted and from which the diagnosis can be relayed immediately to the unit.

The unit consists in a shielded standard 20 feet container that includes the following amenities:

• **X-Ray unit.** As successor to the famous analogue Odelca (of which more than 25,000 were sold), the present Odelca-DR has unique features. Slot-scan technology first developed by Delft on the Amber system provides unsurpassed image quality with ultra low patient dose. Specially designed for more remote and rural areas, the unit is composed of very few components. This makes it easy to maintain. Remote diagnosis indicates any component to be replaced or serviced.

• **ROX, VPX/TB viewer with CRRS and CAD.** The technology to store, diagnose and sent images over a low band with -made by sister company ROGAN-Delft- makes it a complete package.

• **Transport** Because of its limited size, the unit can be transported by locally available trucks. Considering the cost of a truck is more than half the price of a mobile unit and is only used for transporting the unit this (semi) mobile concept is far more economical. With a sophisticated - yet simple to operate - lifting device, the unit can be installed and be up and running in less then 2 hours. In this way, any unit can serve both as a stationary or mobile entity.

• **Energy supply.** With the latest technology in battery and inverters, the unit is capable of making - storing and sending more then 100 images without the need of external power. The on board battery can be charged with ‘whatever electric power source is available’, be it of 220 VAC or other, a generator, solar, wind or otherwise generated energy.
As already discussed one should not compare our envisaged solution with stand-alone modalities as offered by several companies. We offer a complete solution in X-Ray screening where we provide the possibility to send your images even over a low bandwidth (GPRS).

It certainly is interesting for us to participate in prevalence studies, since this would be of a great assistance to further develop our CAD system. Obviously the CAD system will in time be integrated into the systems in and will be done free of charge. We would ask for the data to become available to increase our database to be used for further development of the CAD.

General

The digital thorax system “Odelca DR” is specially developed to meet the growing demand of Tuberculosis and Labour screening. Tuberculosis is a rapidly growing worldwide decease.

The newest technology is used in the development of the Odelca DR. For examples, the detector makes use of the CMOS technology and the generator has a frequency of 100 kHz. The Odelca DR draws out by the very low dose for the client with a very high image quality. This makes the system very suitable for screening purposes. The acquisition software is specially made for the Odelca DR and is guaranteed very user-friendly. A diagnosis can immediately be done on the diagnostic monitor on the spot. Sending these images to a central location requires no user intervention and an image is typically available anywhere in the world just 20 seconds after acquisition.
All components of the DR Odelca are engineered in such a way that the highest possible quality is ensured. The materials used are of high quality and solid material, which makes it possible to place the Odelca DR in a mobile unit. The user-friendliness of the system makes it possible to reach a high throughput (300/day)

**Operation**

The operation of the Odelca DR is very user friendly. Because the DR Odelca has a U-shaped frame, the positioning of the patient is very easy. The motor supported high/low movement is positioned on the main unit and can be easily operated.
The main unit has also the possibility to collimate. In the vertical direction both on the left and on the right side you can collimate. The collimation in a horizontal direction is top centered. This has the advantage that you can collimate the x-ray system on the top of the lungs and collimate from the bottom to the diaphragm cupola.

**Exposure**

The acquisition station is a workstation and a storage station. From this station images can be created and stored, forwarded to the archive and viewed with the special VPX-TB viewer.

To take a picture you first select a client. After the client is selected the user will be guided through a short menu.

When the user chooses to use the pre programmed exposure technique the operator can easily make the exposure. The simple user interface and ease of operation enables a high throughput and excellent workflow.

Delft Imaging Systems developed a digitization platform, which can be entirely adapted in workflow and user interface to your specific wishes and demands. Furthermore, the acquired data can be forwarded to any location brought on line and thus be available to any authorized person.

The belief of Delft Imaging Systems is that a system should comply with the current and future standards and should be supportive to your way of current and wanted workflow. This means in daily practice that a system will be tailored to the demanded workflow and way of working within the department. The Odelca DR makes this already available and is also extreme scalable for future developments.

**Open & standard based solutions**

Delft Imaging Systems stimulates and complies with the open standards and systems. Due to these open standards, implementation of future applications can be guaranteed. In this way you can grow and connect without borders or impossibilities.

**What is included?**

The acquisition station of the Odelca DR will be set up as a diagnostic workstation including Rogan View-Pro X Diagnostic and Review software.

All systems include a DICOM archive (Rogan Online XS Archive) where the acquired images will be stored. These images are on line and can be easily accessed anywhere in the world. Any additional viewers can be set up in a matter of minutes at a very moderate cost.
Diagnostic and Review software

Thanks to the award winning architecture, images are available within seconds.

Ease of use

The software is designed with the input of our valued end users. This has led to a very easy to use and intuitive user interface. Since the interface is Windows based, the appearance is familiar to the well known other applications.

The complete look and feel can be altered to your specific wishes. Toolbars can be altered or be switched in place to comply with your way of working. Together with configurable buttons and programmable automated procedures, VPX makes you dictation easy.

Configurable Layout & Hanging Protocols

VPX is used by many different users. Therefore the chosen configuration of layout and buttons is made user dependent. Your personal configuration will be stored on the Workstation and will be loaded every time you log on to the system. This also includes the personal configurable hanging protocols.
Appendix 9 General Electric
Note: can be delivered mounted into truck

GE Healthcare

Definium AMX 700
Mobile digital radiographic system
The Definium AMX 700 brings new digital capabilities to GE’s successful AMX platform with no compromise in reliability or ease of use.

Digital rollout.

The most popular compact, mobile X-ray system just got more popular.

The once familiar has been propelled into the streamlined world of digital technology. And new levels of image quality and workflow efficiencies have been achieved.

Introducing the Definium™ AMX 700 – a mobile imaging system that’s been revamped with digital horsepower.

For decades, the AMX system was the mainstay of mobile X-ray imaging. It delivered the image quality of a stationary system in a small, agile unit that was easy to use. No wonder it became the preferred choice in the U.S. – with several thousand systems in use globally.

Now, this legacy platform has been infused with the power of GE’s flat panel digital detector. The same detector technology used throughout GE’s comprehensive product line. With the same, consistent software platform.

What’s more, all Definium products utilize the same user interface. Offer the same productivity features. Deliver the same consistent image quality and unsurpassed mobile reliability.

The result: Minimized equipment time. Maximized patient time. Definium AMX 700 will change how you define portable imaging.
Split-second decisions demand technology that’s just as fast. Making those decisions confidently requires more. Like uncompromised image quality. Instant distribution and access to patient data. And optimized imaging workflow processes.

Driving performance.

With new digital capabilities, your productivity is limited only by how fast you can get to the next patient.

The Definium AMX 700 is the only mobile X-ray system utilizing cesium iodide detector technology, the same proven technology that GE introduced to the digital market years ago. This single-piece detector provides the highest image quality with significantly less dose to the patient.

Images are processed within seconds, with immediate review on the integrated monitor. Over 2,000 images can be stored on the Definium AMX 700 and images can be easily transmitted to your hospital PACS for quick and easy review.

And the hassle and expense of managing film or cassettes? They’re left by the wayside.
And image quality.
With 270° of column flexibility, the Galinium AMX 700 can handle virtually any application.
Precision handling.

The Definium AMX 700 capitalizes on decades of mobile experience, as well as continual design enhancements suggested by our valued customers.

Technologists told us they require ruggedness and easy maneuverability. The Definium AMX 700 allows you to focus on your patients instead of the equipment. Its compact design permits quiet and efficient maneuvering throughout your facility. And it can be turned on a dime in tight quarters, like the ER and ICU.

The added touchscreen display provides fast access to your worklist. Once a patient is selected from the worklist, the Auto Protocol Assist feature automatically selects and initiates the required protocols.

A remote control switch is available as an option. The hand-held switch includes a calibrator light to verify image region of interest. An optional barcode scanner is available for quick and easy access to patient information.

The ease of use continues with GE's flexible positioning arm that rotates up to 270° to accelerate exam setup and tube positioning. Anatomy-based customization of images lets you match your clinical preferences. After an initial quality control, images can be automatically sent to your PACS via the wireless transmission option or stored locally for wired transmission.

And if troubleshooting or maintenance is needed, help is close at hand from one of the largest and best-trained service teams in the industry.

The Definium AMX 700. One small system. One giant leap for mobile X-ray.
For more than 100 years, healthcare providers worldwide have relied on GE Healthcare for medical technology, services, and productivity solutions. So no matter what challenges your healthcare system faces, you can always count on GE to help you deliver the highest quality healthcare. For details, please contact your GE representative today.

GE Healthcare
3000 North Grandview
Waukesha, WI 53188
U.S.A.

www.gehealthcare.com
Appendix 10 generator (Atlas Copco)

**Atlas Copco** Generators

QAS 14-20 50Hz – Dual frequency

Environmental friendly package purpose built for portable applications

*Team-up for Total Solutions*
Changing the way you think about portable energy

As part of our product development process, we carried out an extensive market analysis ranging from questionnaires, customer panels and customer visits. With the result, we designed the NEW QAS generating sets, an environmentally friendly package, meeting the requirements of global and national rental customers, construction applications, and public utility companies. Core values of our NEW QAS generating sets, the new premium successors of our proven QAS generating sets are: Clean, Quiet, Robust, Reliable, Low cost of ownership and excellent serviceability.

Specifications

The Engine
- The QAS 14-20 generators are powered by the New Perkins 400 Series diesel engines, 5- or 4 cylinder naturally aspirated in-line engines.
- High performance and excellent power and torque characteristics ensure prompt power supply.
- Long service intervals lower the Total Cost of Ownership.
- A new combustion chamber design results in low noise emission.
- The New Perkins 400 Series diesel engine fully comply with EPA Tier 2 (EU stage 2 and TA level 4)

The Alternator
- Synchronous brushless type alternators are fitted.
- Mirror image windings are Class H and IP23 enclosure.
- The auxiliary winding of the alternator allows overloading to easily start electric motor.

The Enclosure
- Is protected from rain, dust and snow with a powder coat finish for durability and excellent resistance to corrosion to ensure the generator retains a higher residual value.
- A standard sealed spillage-free frame, which ensures that all fluids can be retained within the frame, eliminates spillage problems.
- Forklift slots, toe down points and lifting beam ensure easy maneuverability for construction site usage.
- Wide opening doors offer excellent accessibility to all components.
- Local and remote start are standard, and all controls are centralized above the socket panel, terminal board and all key operating functions can be supervised without opening the canopy.

Optional features
- A wide range of options allows our customers to tailor-made their preferred generating set.
- Options are: external fuel tank connections, battery charger, constant heater, flywheel, recondition, ET protection, E2/F configuration, electronic speed regulation, dial frequency, customer-colour, terminal board and sockets. A skid mount, which can easily be fitted, offers a minimum of 30 hours running at full load. The QAS generating sets are designed to be combined with Trolley and Lighting Tower variants.

Technical data

Performance data

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<thead>
<tr>
<th>Type</th>
<th>QAS 14</th>
<th>QAS 20</th>
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<tbody>
<tr>
<td>Frequency</td>
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<td>50</td>
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<tr>
<td>Rated Speed</td>
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<td>Rated Power FC</td>
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<td>Rated Power FC</td>
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<td>Sound pressure</td>
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<td>Fuel autonomy</td>
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<td>Environmental conditions</td>
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Unit Dimensions and weight

<table>
<thead>
<tr>
<th>Type</th>
<th>QAS 14</th>
<th>QAS 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
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<tr>
<td>Length</td>
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<td>Weight (dry)</td>
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<tr>
<td>Weight (wet+oil)</td>
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<td>969</td>
</tr>
</tbody>
</table>

Visit our website: www.atlascopco.com

Use only authorized parts. Warranty or product liability does not cover any damage or malfunction caused by the use of unauthorized parts.