

HEALTHCARE IMAGING Products by SIEMENS in Moldova

<http://www.healthcare.siemens.com>

First big government project (in early 90's)

- More than 14 X-ray machines
- Many UltraSound equipment
- Angiography, C-Arms, CT's, MRI
- Mammography systems.
- Litotripters – urology
- etc.

Diagnostic Imaging			Therapy	
Nonionizing		Ionizing	Particle therapy	Shockwave
RF and Magnetic Fields		X-Rays		RF
MRI	Ultrasound	CT Angiography X-Ray Molecular Imaging	Linear accelerator	Lithotripsy
Magnetom C! – 0,35T Avanto 1.5T Essenta 1.5T Skyra 3T	Aquson X150, X300, X500, X600, X700 S1000, S2000	Emotion Duo, 6, 16, Sensation 64 Definition AS128 Luminos RF, dRF Iconos R100, R200 Artis Zee Biplane, etc	LINAC	Lithoskop

Safety is First!!!



- Many diagnostic and therapy equipment requires high level of personal education and safety because of harmful radiation
- Requires a medical physicist
- Requires an equipment dose control
- Requires a quality control
- Requires a person and patient dose control
- Requires standard and regulations by law

Our interests - Ionizing radiation equipment

- Analog X-ray – Uses film with screens and I.I.
- Computed X-ray (CR)- uses phosphor plates to store exposed image
- Digital X-Ray - Uses FPD, I.I. + Cam
- But nothing is changed in 100 years
- all uses same old principle and X-ray vacuum tubes.

Analog X-Ray's in RM



- Sirescop CX – old working horse, in RM from 1994
- Iconos R100,
- R200 semi-digital
- CR Cassettes + Cam
- Mammomat

Analog X-Ray benefits

- Good Image quality
- Cheaper solution
- Does not accept X-ray technician faults in exposures or film processing
- Simple X-Ray control, usually manual
- Simple workflow
- Small part of brain or none used during operation.

Analog X-Ray weak points

- Requires a special dark room
- Uses harmful chemicals
- No doubling of results
- Patients irradiated more often
- Dose adjusted by X-ray technician manually and often overexposed because of:
- Chemicals are old, film processor not warming up chemicals, doctors and patients do not have enough time to wait full film process, patient in accident - quick result are needed
- X-Ray tube is old and works in low KV's.

Digital solution from Siemens- Luminos dRF



Digital X-Ray Benefits :

- High image quality
- High patient throughput
- No overexposures
- Dose controlled by DAP meter (options)
- Dose report are available in database
- Lower Dose than conventional analog systems
- RIS and PACS communication
- No needs of hardcopy (film)

Digital X-Ray weak points:

- High price
- Special operating environment conditions: temperature, humidity etc
- Personal training required
- Complicated for old physicians
- No service after warranty (institutions does not have service contracts and money)
- No service – no trained engineers and service representatives

Computed Tomography – CT Benefits


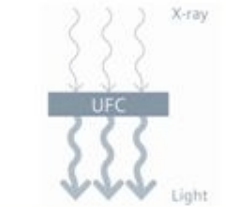




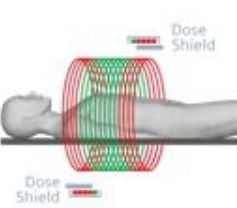
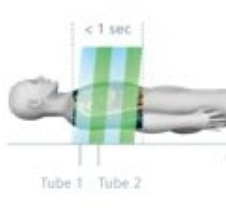

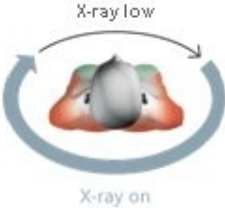


- Fast and detailed diagnostic
- 3D imaging and visualization
- different reconstructions from raw data can be acquired without additional patient irradiation
- Non invasive intervention (only contrast media)
- Cardio, vascular, neuro specific sw option available.

CT in RM

- Emotion DUO, 6, 16, Sensation 64, Definition AS128
- Medpark, Urgency Hospital, CDG, Magnific



SIEMENS CT Dose saving techniques

					
<p>Up to 68%</p> <p>CARE Dose 4D</p> <p>1994</p>	<p>Up to 30%</p> <p>Ultra Fast Ceramic (UFC)</p> <p>1997</p>	<p>Up to 70%</p> <p>Hand CARE</p> <p>1999</p>	<p>Up to 50%</p> <p>Pediatric 80 kV Protocols</p> <p>2002</p>	<p>Up to 50%</p> <p>DSCT</p> <p>2005</p>	<p>1-3 mSv</p> <p>Adaptive ECG-Pulsing/Sequence</p> <p>2007</p>
					
<p>Up to 25%</p> <p>Adaptive Dose Shield</p> <p>2007</p>	<p>< 1 mSv</p> <p>Flash Spiral</p> <p>2008</p>	<p>No penalty</p> <p>Selective Photon Shield</p> <p>2008</p>	<p>Up to 40%</p> <p>X-CARE</p> <p>2008</p>	<p>Up to 60%</p> <p>IRIS</p> <p>2009</p>	<p>Up to 60%</p> <p>SAFIRE*</p> <p>2010</p>

Angiography & Interventional X-Ray Systems

- Used in surgery – trauma, cardiology, vascular surgery etc.
- Mobile and Stationary
- C-Arms and Angiography systems
- Requires X-Ray safety for all persons in operating theater.
- Using of lead aprons, glasses, thyroid, ovary and gonad protection is required.

C-Arm's in RM

- Siremobil Compact -L
- Arcadis Avantic
- Arcadis Orbic 3D

C-Arm Arcadis Orbic 3D



Angiography- Artis Zee

- State of art interventional X-Ray System
- Used for vascular, neuro, cardiac surgery
- Different detector sizes and speed available
- Biplane and Monoplane systems
- Operating tables from Maquet, Trumph, Siemens
- All in-room persons must wear protective clothing and dose meters!!!

Artis Zee biplane – SCR Chisinau



Lithotripter

- Used Shockwave head for destroying the bones
- wide range of urological applications
- Uses both X-Ray and US for stone exact positioning

Siemens Lithoskop



Ultrasound

- Don't forget!!!
- Use non ionizing investigation firstly!!!
- it leads to global dose saving as a result lower genetic mutations, you don't know how X-rays will influence on your body.
- Every person can not be monitored by dosemeter, use your brain

MRI

- No ionisation harm like X-rays
- Different Applications for soft tissues
- Neuro, abdomen, cardio, etc
- High price for investigation
- High maintenance cost
- For supercon magnets special safety required
- High field magnetic fields
- High power RF fields
- Patients with metal part inside special requirement

MRI- permanent magnet

- Magnetic Field is permanent
- Low owner cost
- Low power consumption
- Open construction – kids, neonatal, old people
- Claustrophobic patients friendly
- Homogeneity is temperature dependent

Magnetom C! – 0,35T



MRI High field 1.5-3T

- Superconducting magnets
- Uses Liquid He 1500-2000 liters of LHe
- Siemens Uses 0% Lhe boil off technology in 4K magnets (-269C)
- High owner cost
- High power consumption
- Highest quality studies

Magnetom Avanto 1,5T



Skyra 3T



Thank for attention!

- Prepared by Costov Evgheni
- Service engineer for Siemens products in healthcare imaging sector like X-ray, CT, MRI, Angiography systems.