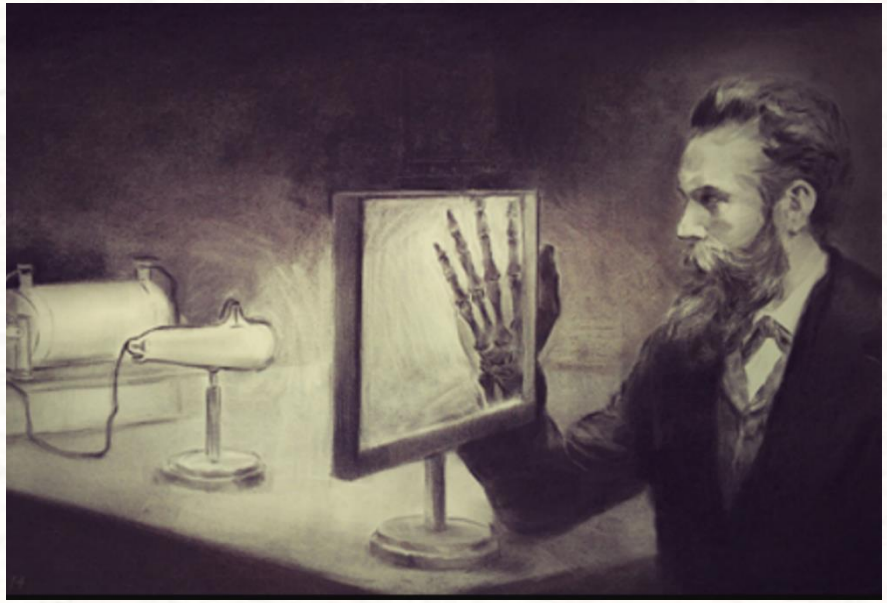
Mobile & Portable X-ray Systems

Presented by: Tom Bledsoe
Bledsoe Imaging Group, LLC

Introductions!

Mr. Tom Bledsoe



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Portable vs. Mobile Systems- Definition

Sometimes these terms are used interchangeably

- **Mobile:** Simply means moveable –Larger generator and capable of 90- 125KV and 40 to 300ma.

- **Portable:** Compact and Transportable- 40-90KV and 10-20 mA (Backpack or case)

Portable vs. Mobile Systems- Definition

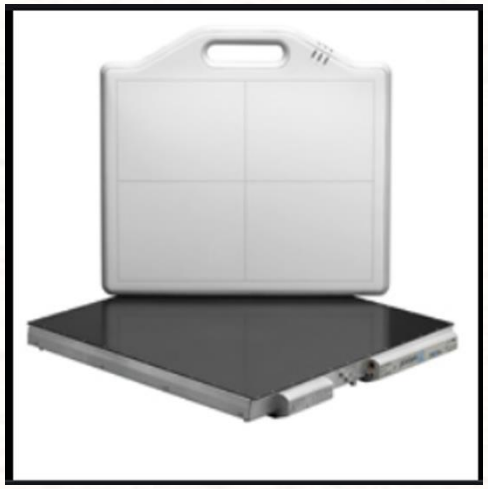
Why do we need Mobile X-ray systems?

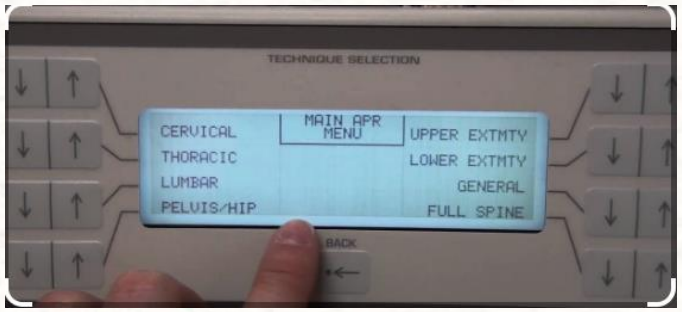
Portable and Mobile Systems purpose.

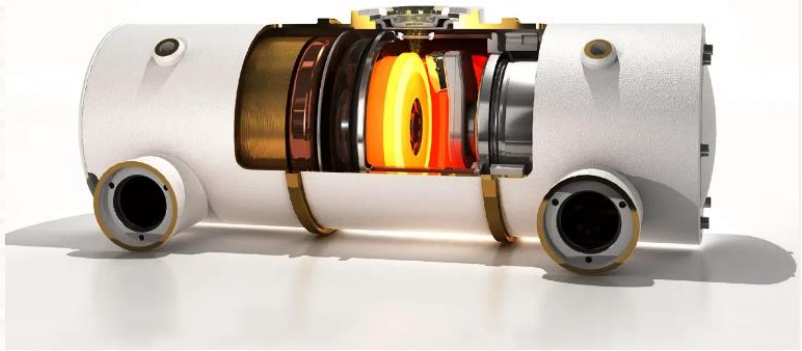
- Mobility issues with patients (depending on the injury movement could cause more harm)
- Not practical to transport patients (ICUs, Post-surgical, Emergency Room…etc.)
- Nursing homes, prisons, and other “off-site” Medical Facilities
- Veterinary applications (horses and large animals)
- On the spot -quick reads by physicians (Emergency Rooms, ICU’s, O.R.’s,,, etc.)

Components in a Digital Rad Room?

- X-ray Generator
- X-ray Tube
- Collimator
- User Interface Console
- Image Receptor- DFP
- Tube Support
- Patient Table or Stretcher







Components Necessary for Mobile X-rays?

Mobile X-ray Components

- X-ray Generator
- Control Console
- X-ray Tube
- Manual or Motorized Drive wheels
- Column or tube support arm
- Image Receptor (IR)

Mobile Retrofit- Components

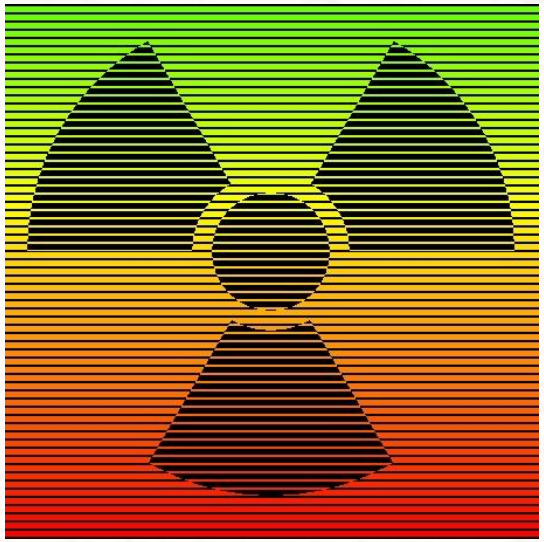
- X-ray Generator
- Control Console
- X-ray Tube
- Manual or Motorized Drive wheels
- Column or tube support arm
- Image Receptor (IR)

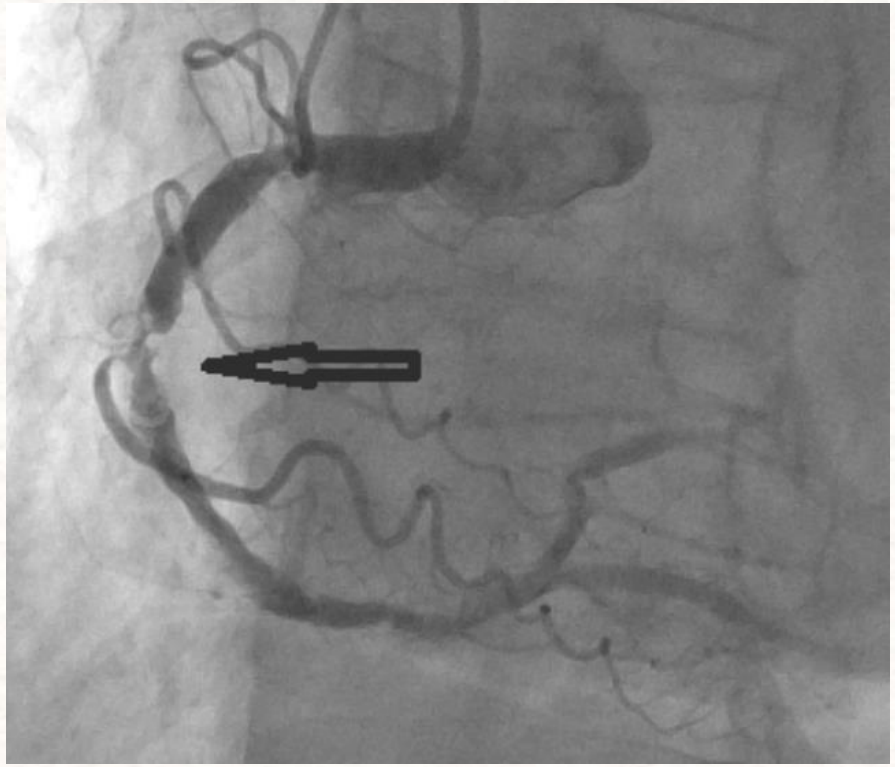
Digital-Mobile X-ray Components

- X-ray Generator
- Control Console
- X-ray Tube
- Manual or Motorized Drive wheels
- Column or tube support arm
- Image Receptor (IR)

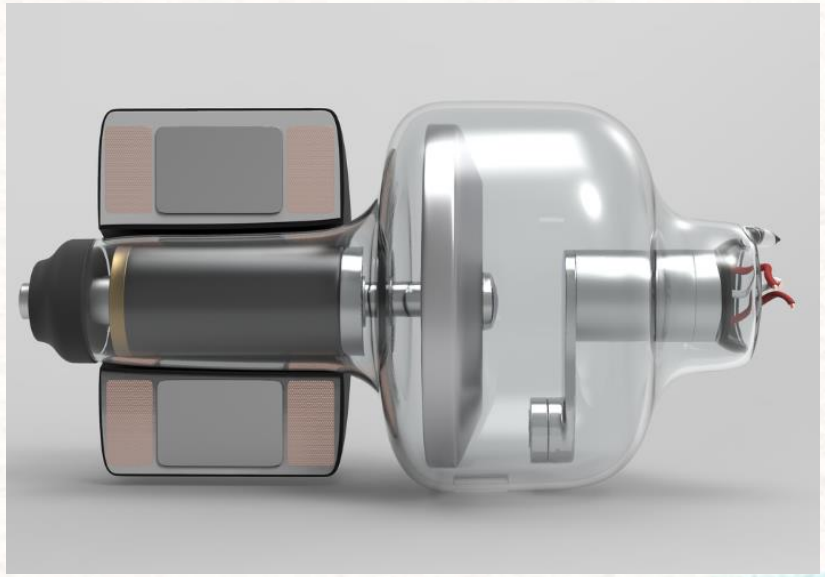
Any questions so far- It's about to get real

Why even bother?





Myths?



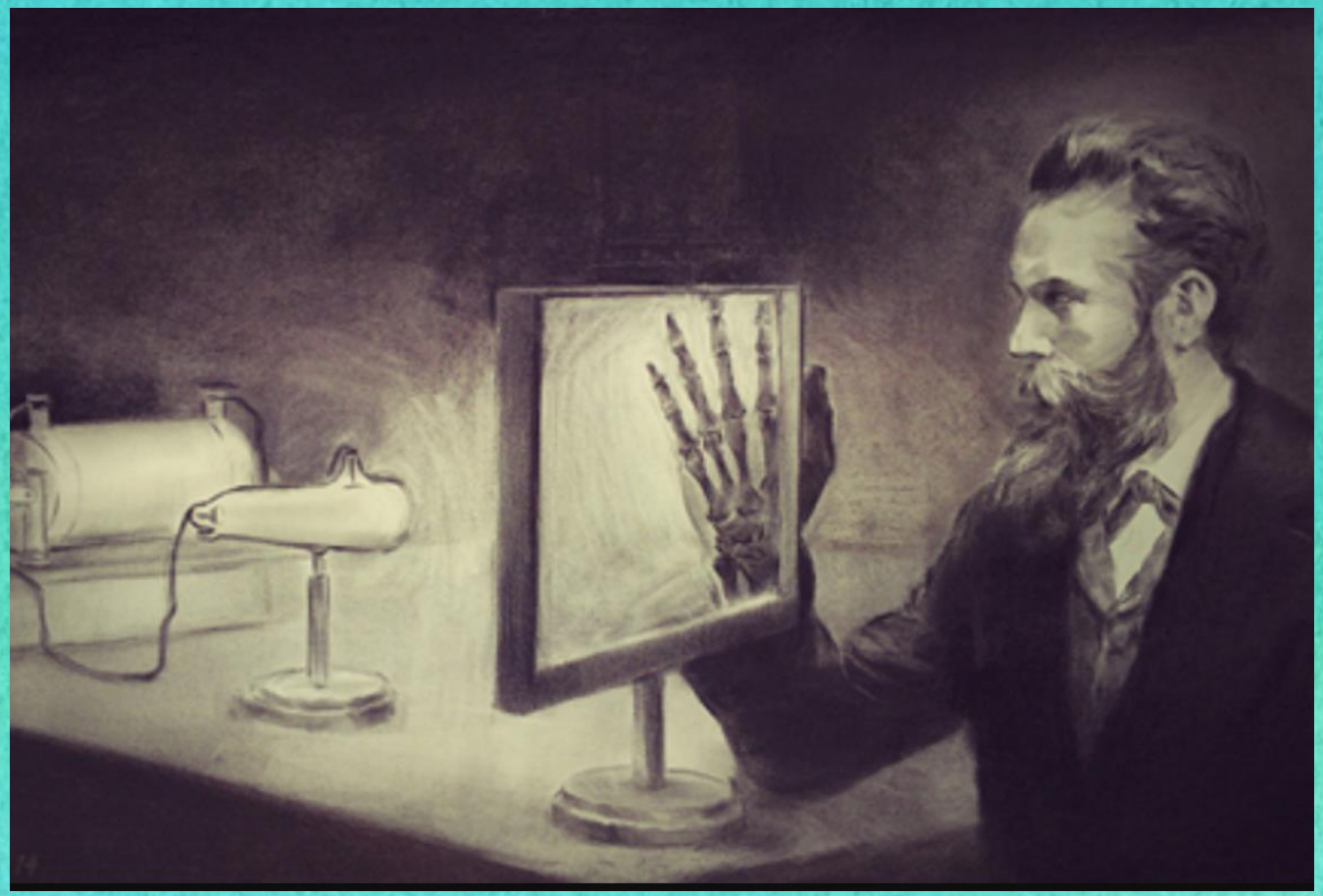
DANGER!

Discovery: November 8, 1895

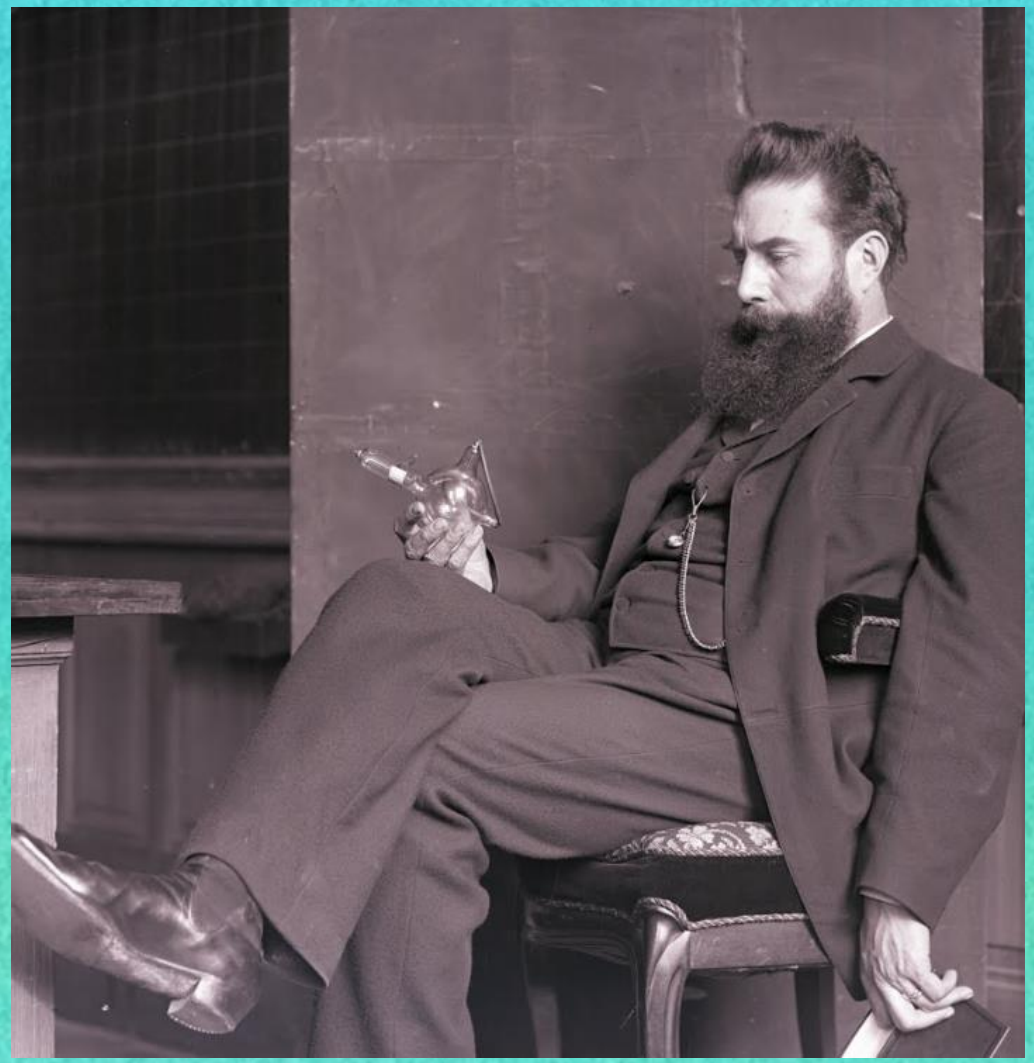
Wilhelm Conrad Roentgen

University of Wurzburg

Crookes Tube



Notable:



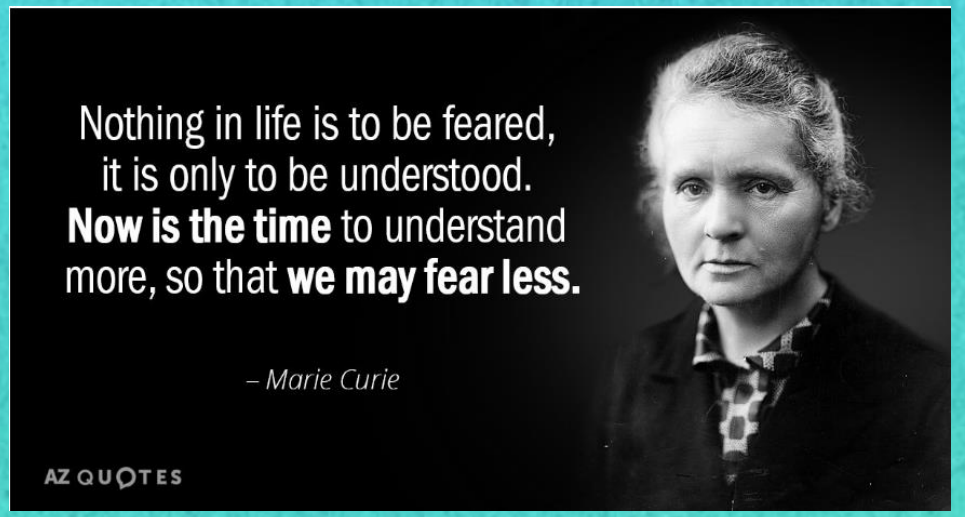
Professor Roentgen won the first Nobel Prize in Physics-in 1901

"I did not think, I investigated"

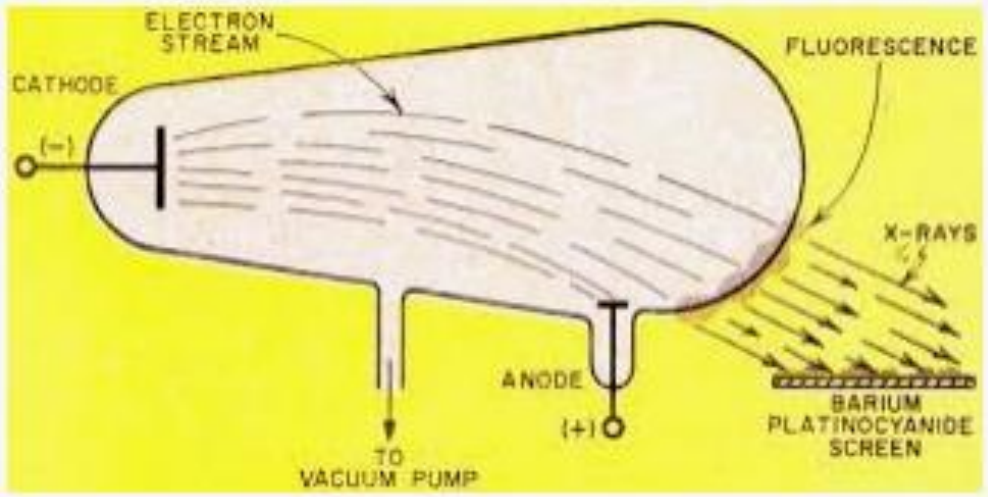
Notable:

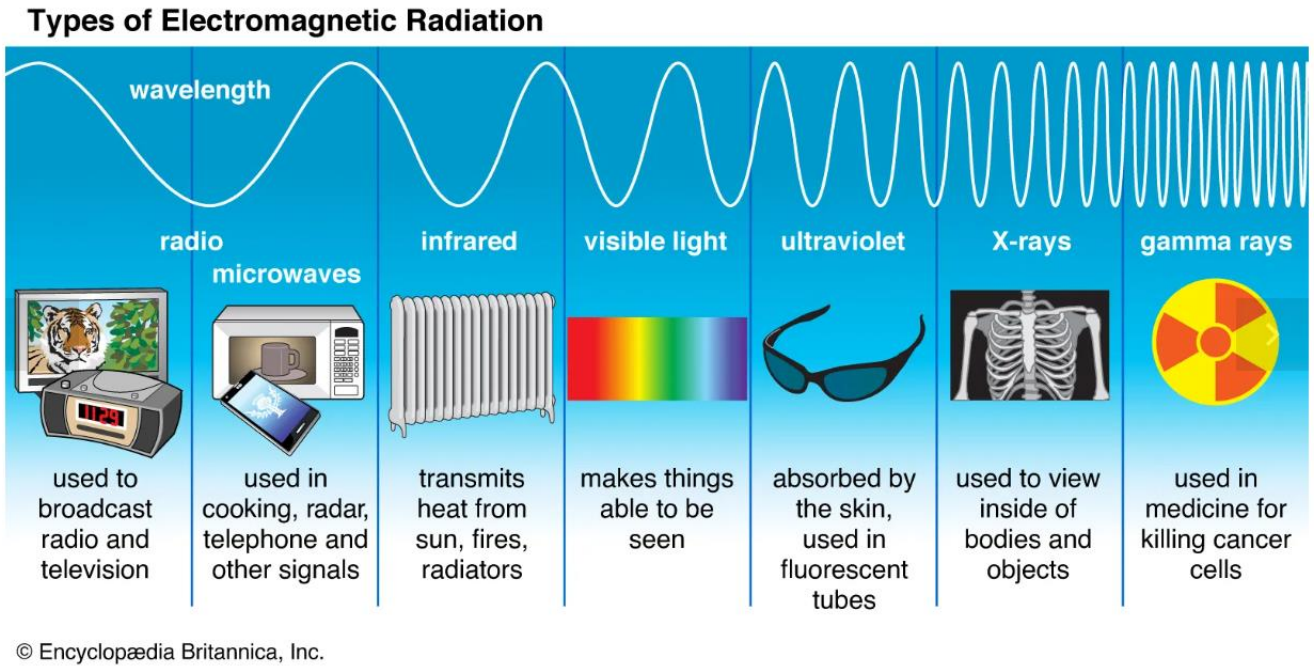
Madam (Marie) Curie

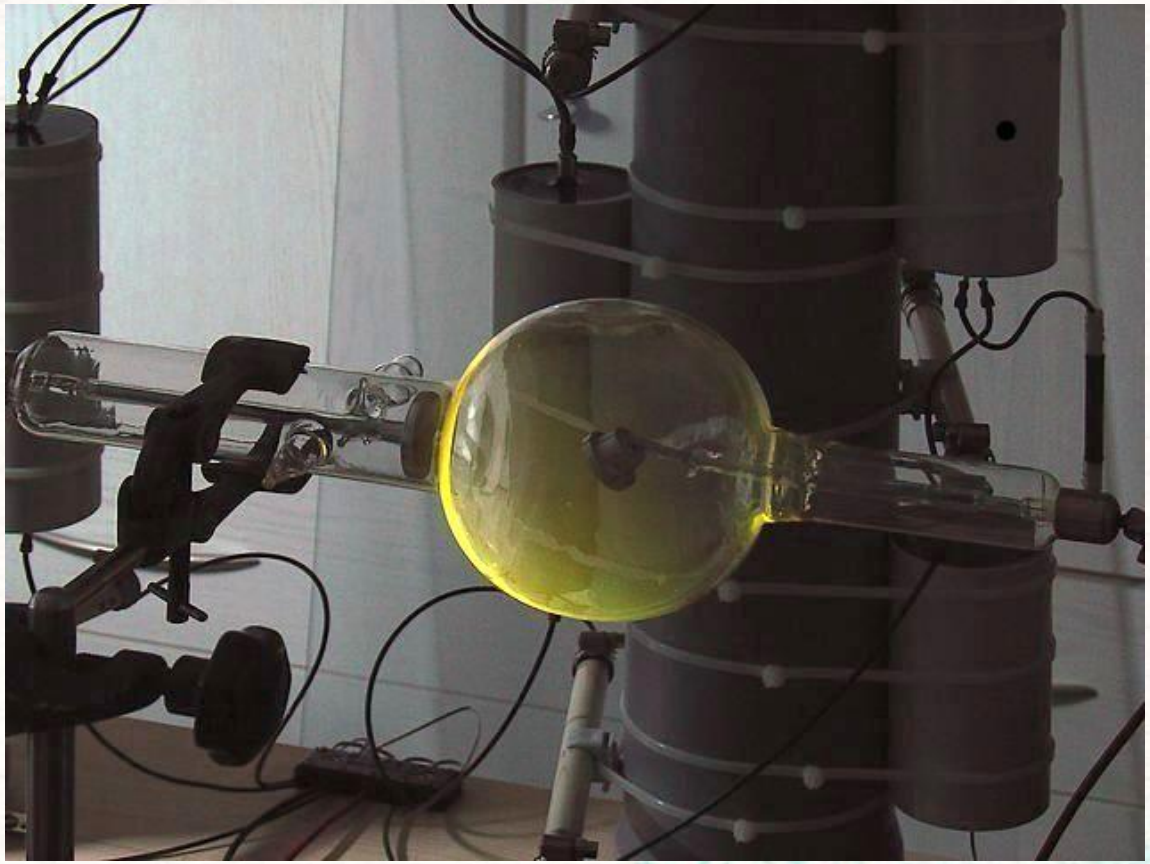
- First person to win 2 Nobel prizes
- Discovered Radium and Polonium
- Coined the term "radioactivity"
- Brought X-ray to the Battlefield in WW1
  (using a mobile Xray unit called ***"petite Curie"***



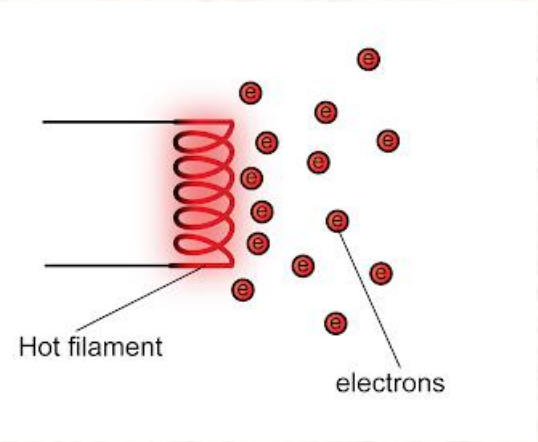
X-ray Production

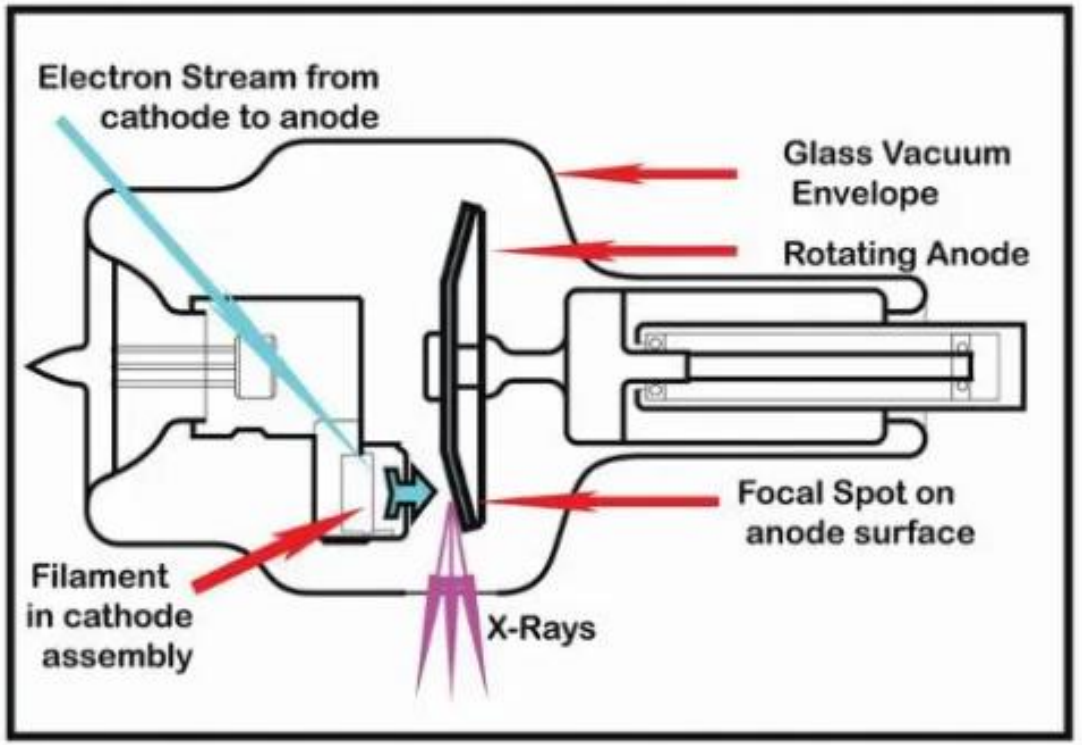


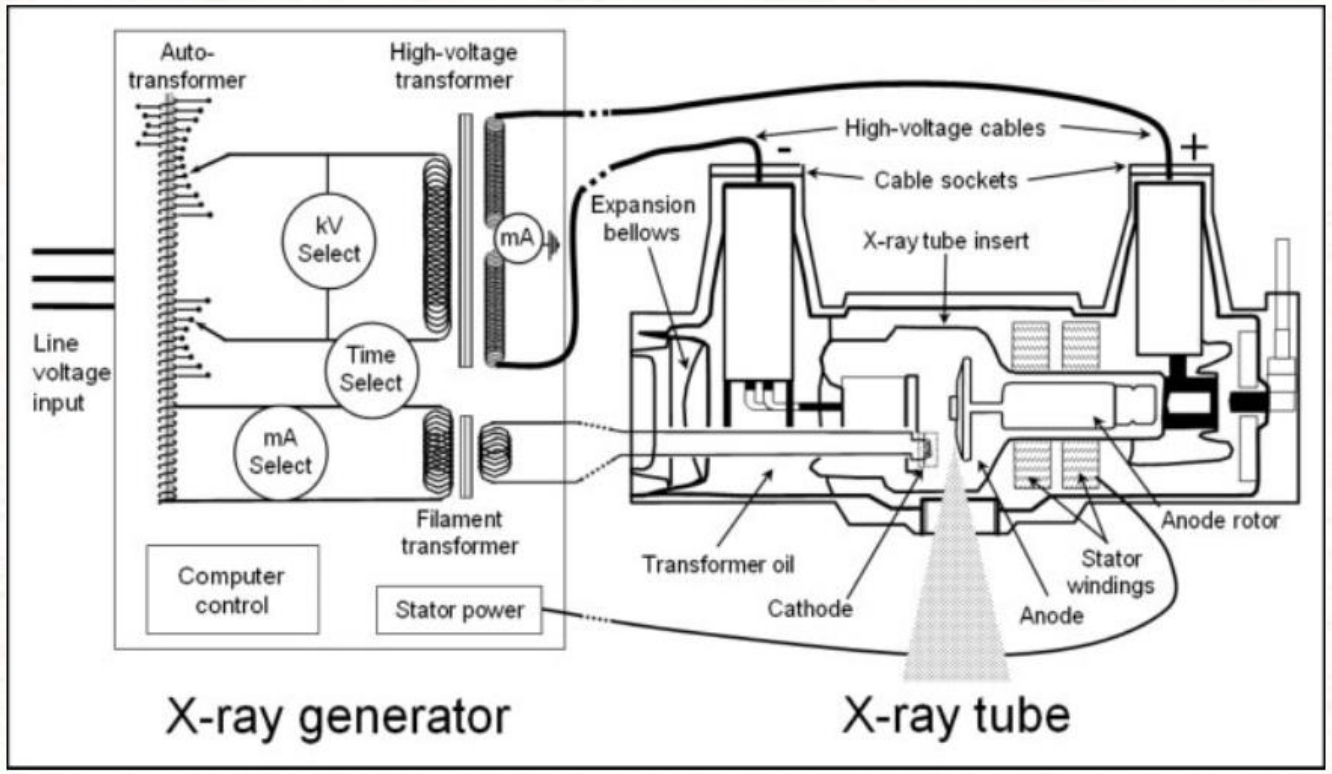


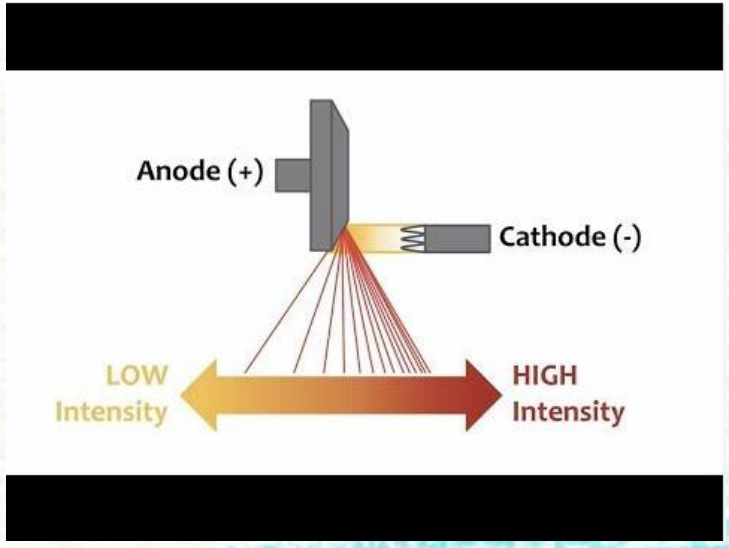


X-ray Production

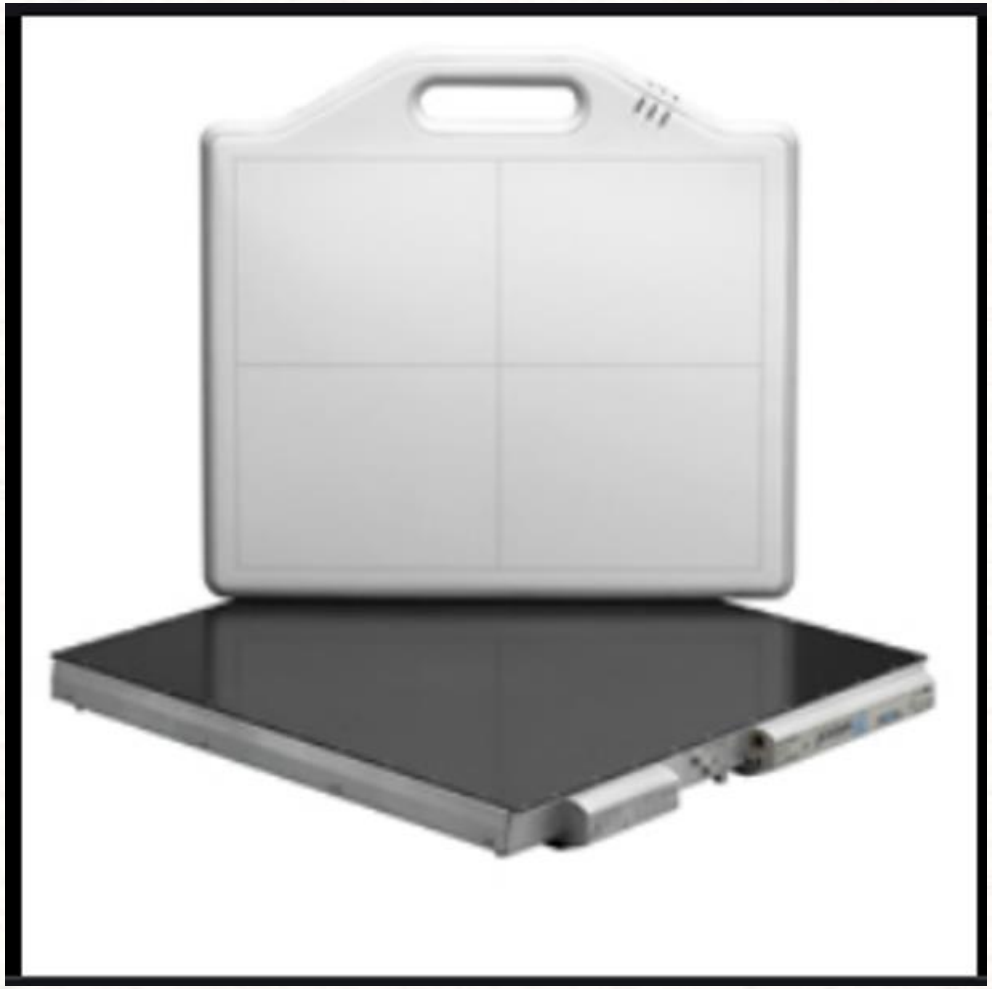




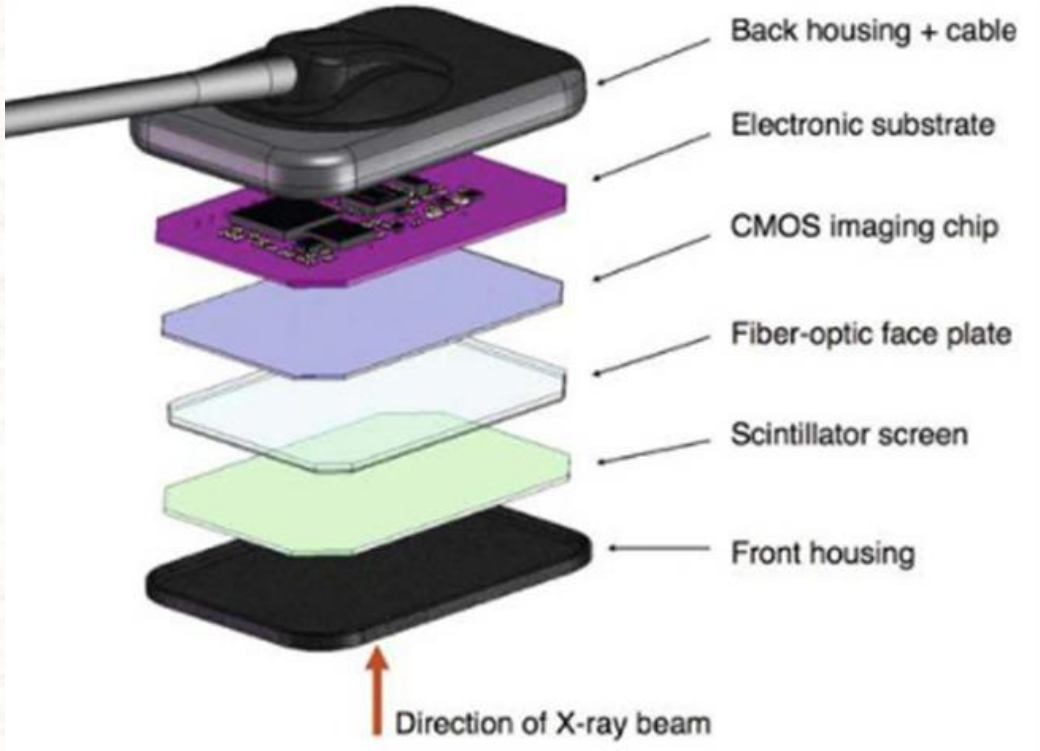




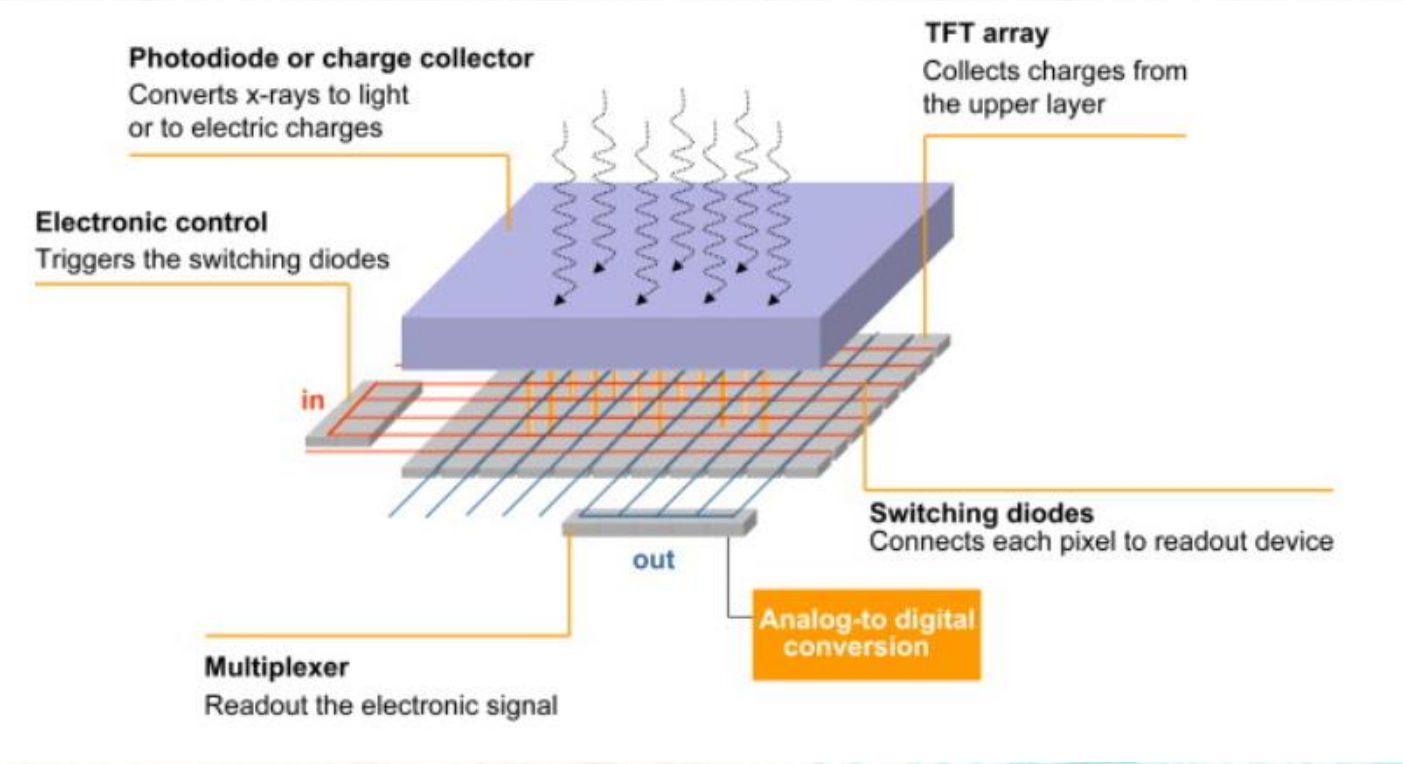
Digital Flat Panel (IR)



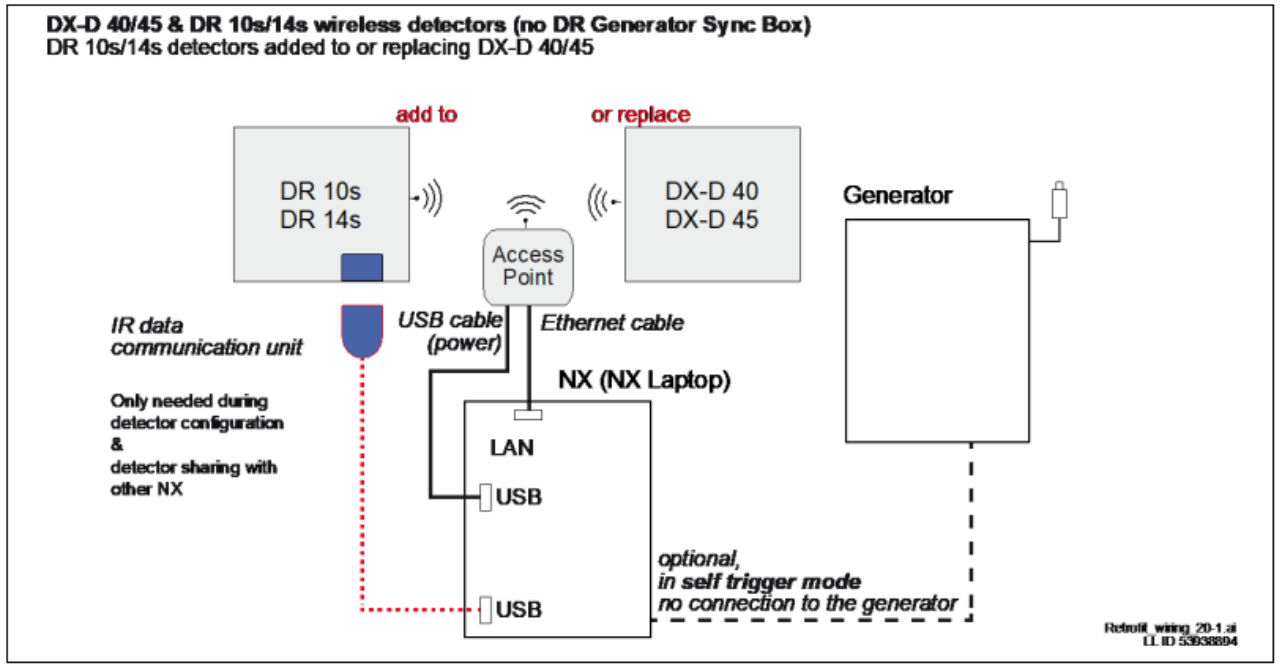
Producing an Image

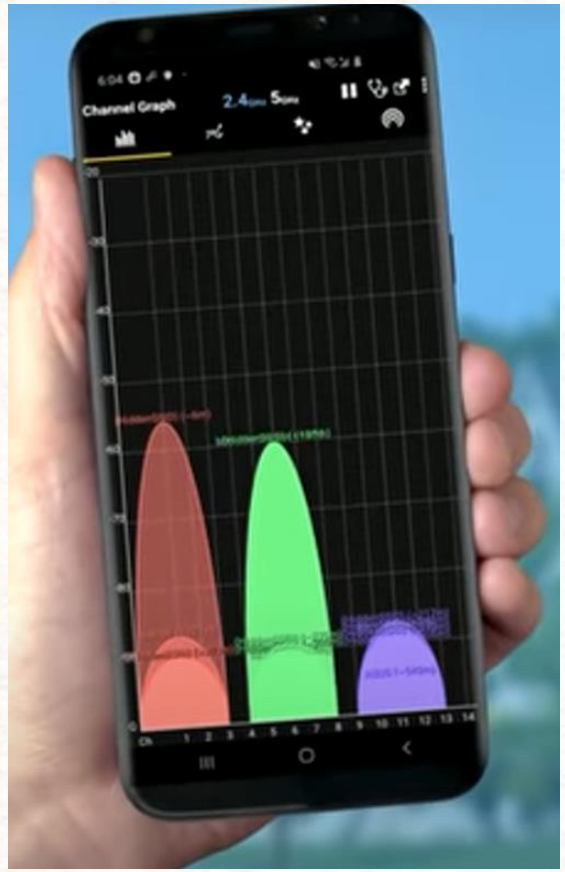


Producing an Image



Producing a "wireless" Image





SSID- GE PORT1

Password- Service password

Testing overall operation and safety

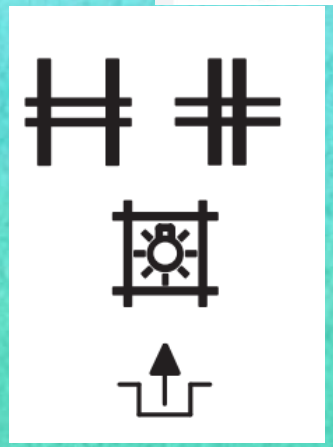
Visual Inspection

Functional Check

Power Cord Check

Visual Inspection

- Stickers
- Labels
- Indicators
- Tape Measure
- Hand switch & Holder
- Bumper



Direction 2173224-100 (page 17-18)

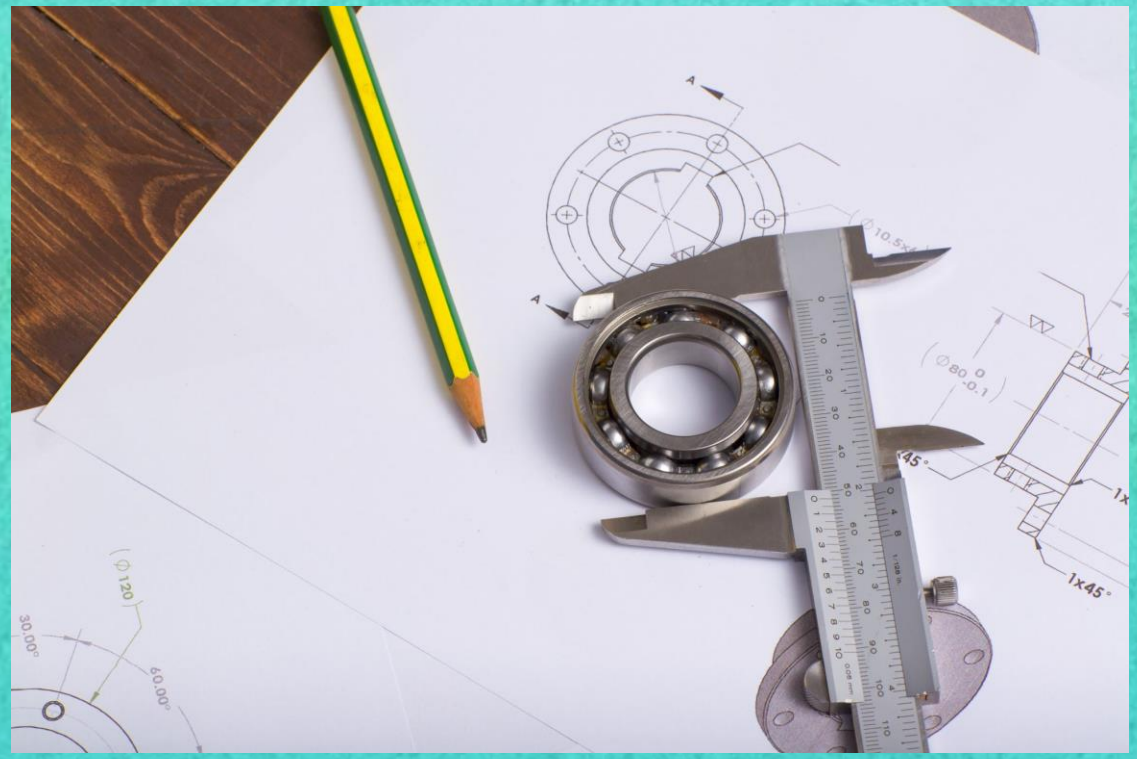
Visual Inspection

Collimator
Indicators
Tape Measure

Direction 2173224-100 (page 17-18)

Functional Check

KV/ mAs Controls
Drive System
Column Locks
Tube angulation
Collimator Light
Bumper
Hand Switch



Direction 2173224-100 (page 19-20)

Power Cord Check

Condition of cord & plug

Electrical Safety?

Direction 2173224-100 (page 21)

Critical Component

**1st Position- Prep
Heat Filament
Spin Rotor
Gives "ready"

** 2nd Position- Expose
If all factors are met. (panel ready)
Rad Room- Bucky, Coll. Etc

Side button- Collimator lamp

SIGNAL NAME	SIGNAL DESCRIPTION
-COLLIMATOR	This low signal indicates that a NO EXPOSURE HOLD condition exists at the Collimator. This input is read only when the Radiographic Tube is selected.
3 -EXP	Low Exposure signal to the HT Control PCB. If -PREP is low then a Spot Film or RAD exposure is made, otherwise, it as understood as a Fluoro exposure.
HT-C CLK	Serial data clock from the HT Control PCB. This clock synchronizes the HT-C DATA signal.
HT-C DAT	Serial data from the HT Control PCB. This data is synchronous with the HT-C CLK signal.
-HT INL	This signal is low when the switch in the high voltage transformer is in the RAD position. This is a safety interlock which prevents an exposure if the high voltage switch (in the HV Transformer) is in the wrong position.
-LINE CONT	A low signal energizes the main line contactor K5 in the Power Module.
1 -PREP	Command to the HT Control PCB to boost X-ray Tub Filament to the value of mA selected and to start the X-ray Tube Rotor is RAD Tube is selected.
2 -READY	This low going signal indicates the system is ready to make an exposure (Prep cycle completed).
-THERMOSTAT	This signal from X-ray Tube indicates the overheat of the Tube.

X

X

Cable Maintenance

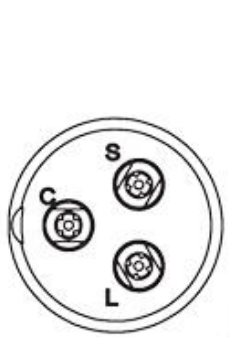
Cable routing check (clamps/ pinch points)

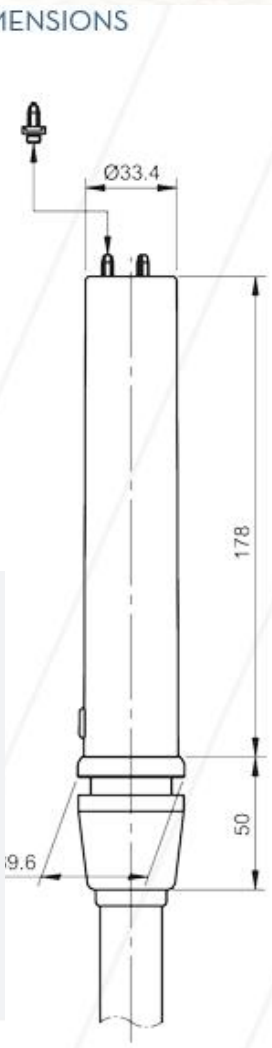
Oil vs Grease

Inspect- Clean and Re-grease

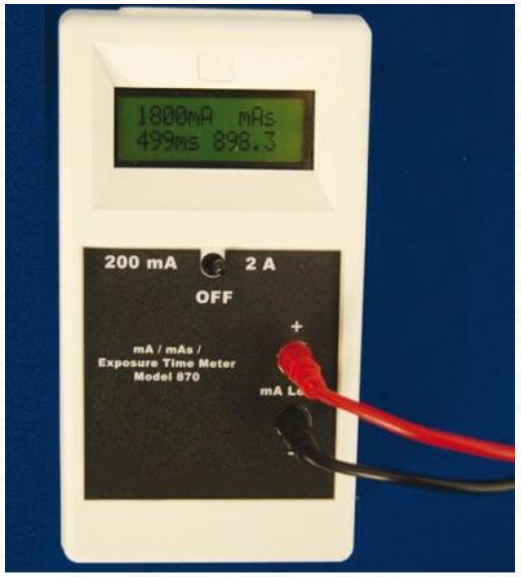
Lock rings (set screws)

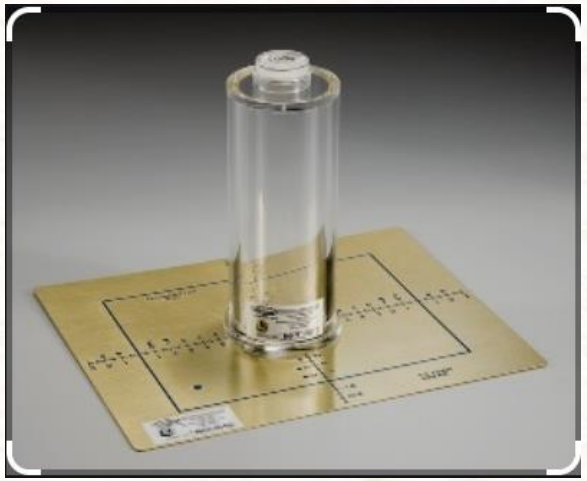
Tank side- check and/or replenish oil (11 CC's)

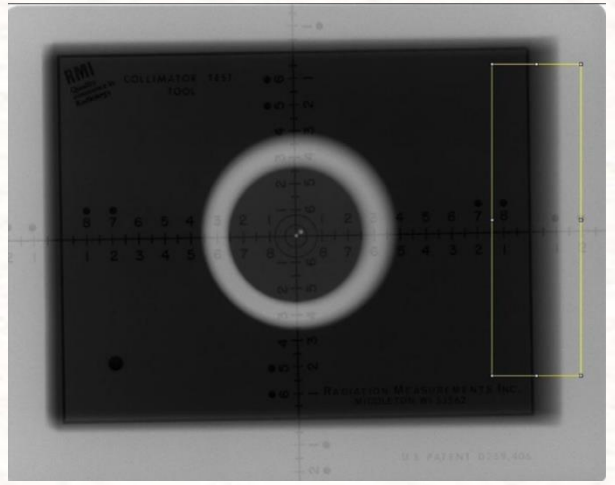




Test Equipment and setup

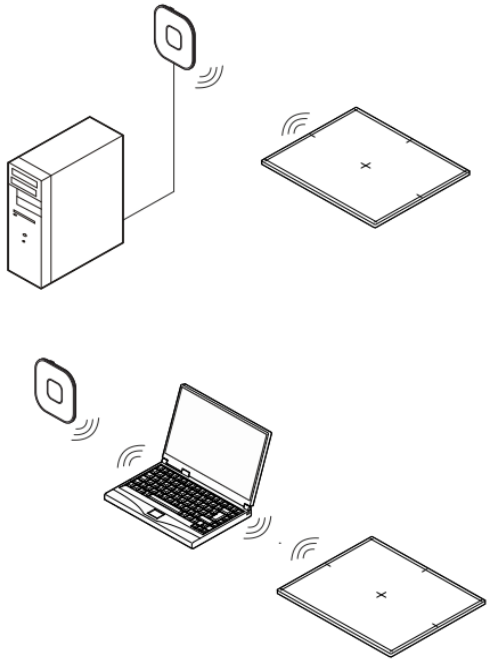


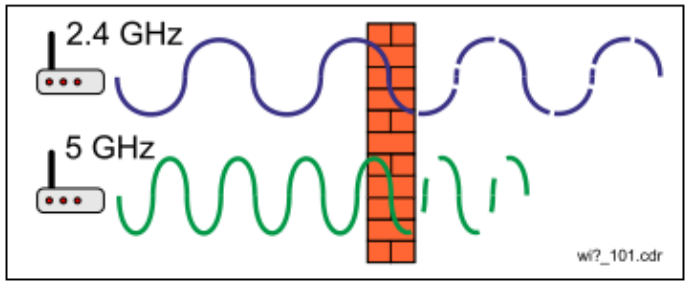




Inspect	Requirement	Inspector's Notes
3-1-1 Generator Operator Indicators Required during Installation, preventative maintenance calls, or when replacing major components.	[ ] Check for proper operation of tones and buzzers as required by regulations. Refer to "Generator Operator Indicators" in Section 2 of Direction 2173221–100, *AMX–4+ Ratings And Specifications*, and perform defined inspection.	
3-1-2 Technique Accuracy kVp/mA Required during Installation, preventative maintenance calls, and repair.	[ ] Actual kVp matches select kVp. Refer to "kV Accuracy" in Section 2 of Direction 2173221–100, *AMX–4+ Ratings & Specifications*, and perform procedure.	
3-1-3 Indirect Linearity Required during Installation, preventative maintenance calls, and repair.	[ ] Refer to "Indirect Linearity" in Tab 3 of Direction 46–013894, *System Field Test for HHS*.	
3-1-4 Technique Accuracy – mAs Required during Installation, preventative maintenance calls, and repair.	[ ] Refer to "mAs Metering Accuracy" in Section 2 of Direction 2173221–100, *AMX–4+ Ratings & Specifications*, and perform defined procedure.	
3-1-5 Reproducibility Of Exposures – Non–AEC Required during Installation, preventative maintenance calls, and repair.	[ ] Refer to "Reproducibility" in Section 2 of Direction 2173221–100, *AMX–4+ Ratings & Specifications*, and perform defined procedure for non–AEC mode exposures.	

Retrofit Panel

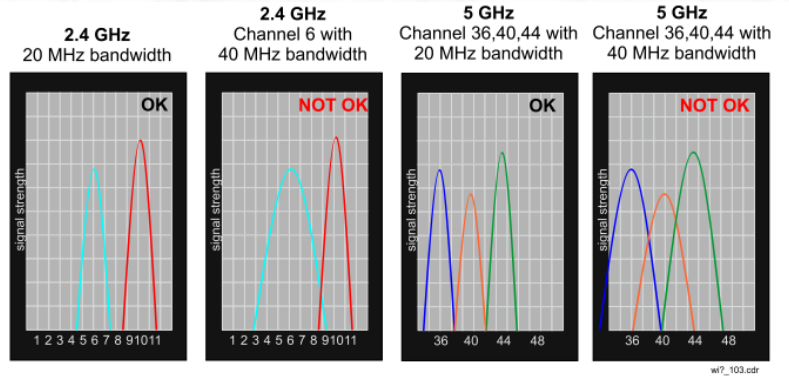




Lower frequency- Better penetration

Higher frequency- Spotty signal

- Login info for AP
- Access Panel Software from pc
- IP address for panel
- Test connection
- Wifi Sniffer for best signal quality



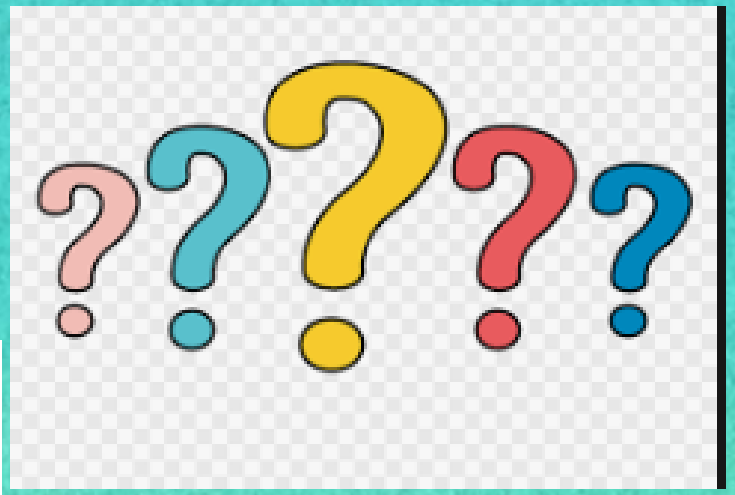
Unwanted cross-talk

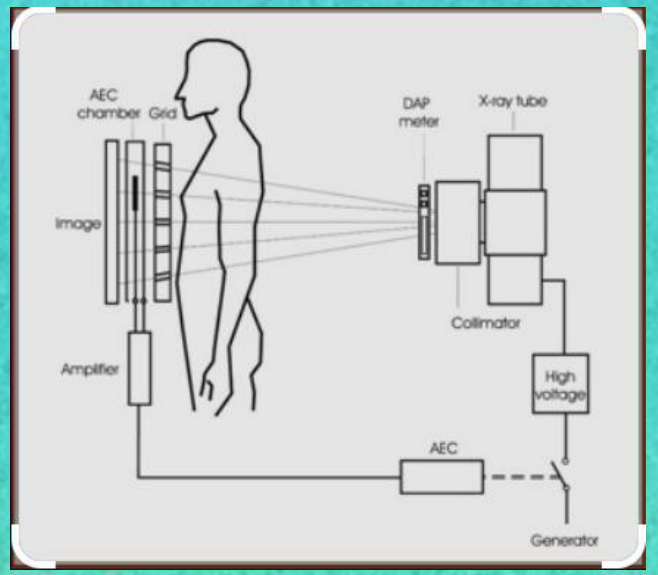
AMX 4 HHS Testing
Important Checks

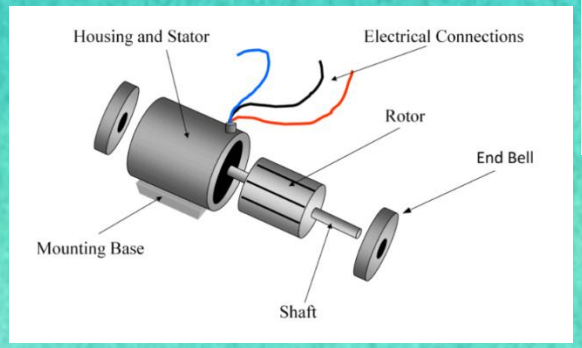
- Operator Indicators
- KV Accuracy
- Linearity
- MAS Accuracy
- Reproducibility
- Collimator Function
- Collimator Alignment

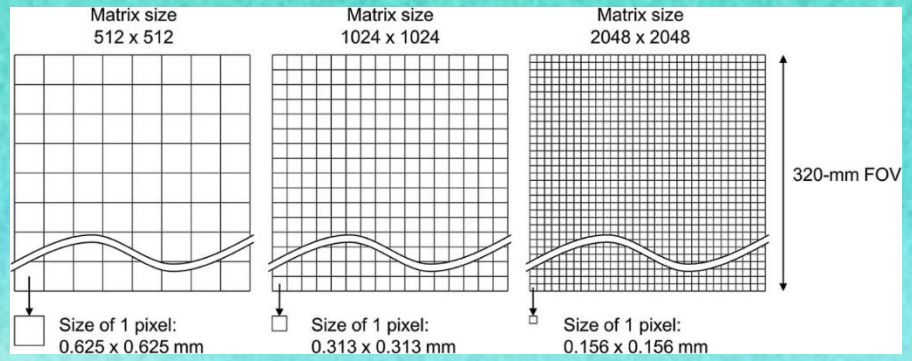
Direction: 2173221-100

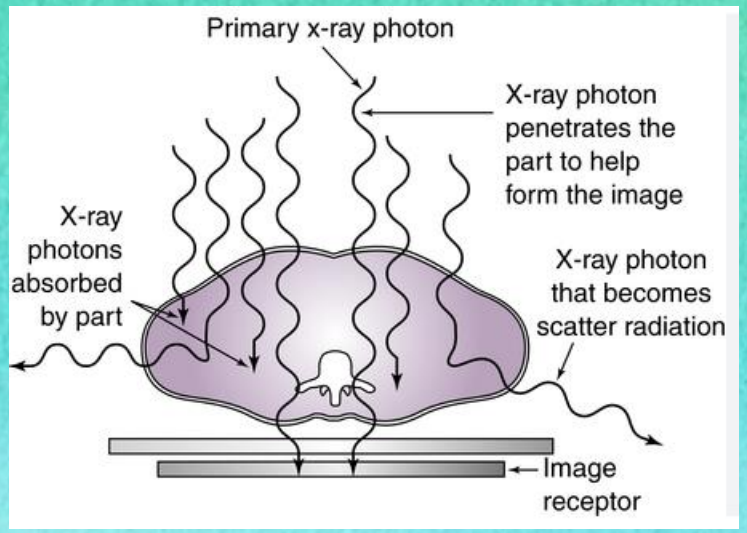
Thank you for attending!
Questions???

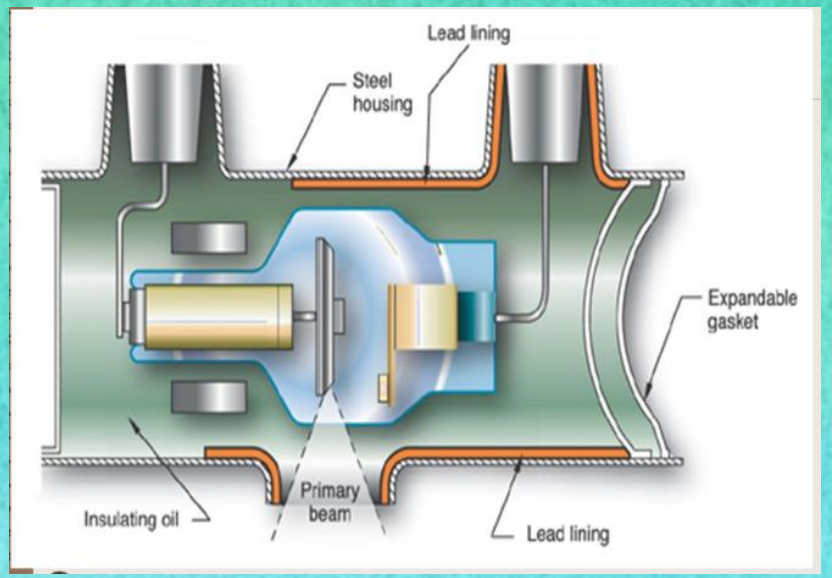




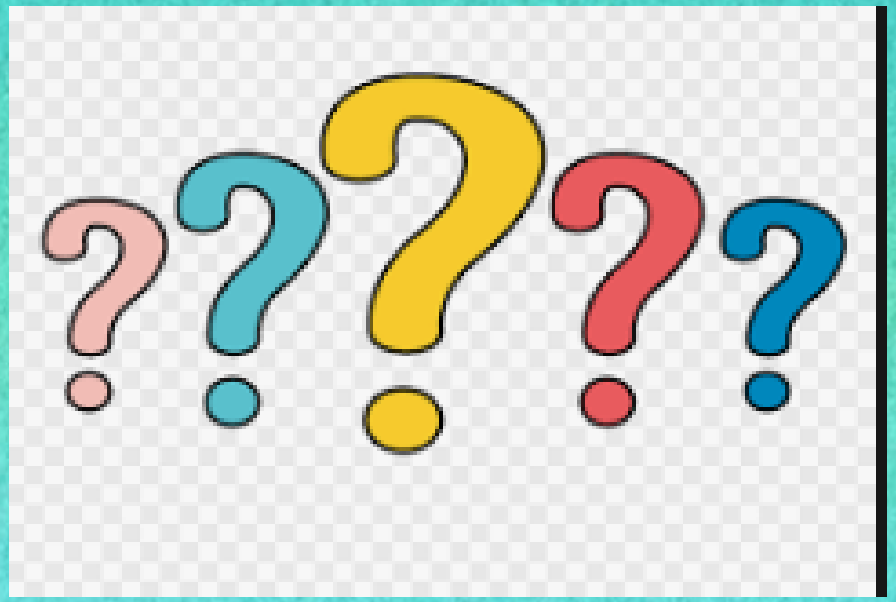








Trivia Time



Mobile & Portable X-ray Systems

Trivia Questions:

1. What was the name of Madam Currie's mobile X-ray
2. Candlestick pins layout (Key)
3. Collimator tape measure (cut off)
4. Collimator knobs setup (dial)
5. Two ways to turn on the localizing lamp
6. 2.4 GHz vs 5 GHz
7. Draw a picture of the Collimator Light button

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