



Technology Transfer - A Dillon Perspective after 20 years

JLAB Tech Transfer Workshop

January 11, 2018



Outline

- I. History
- II. Technology
- III. Timing
- IV. Branding

History

Cardiac Perfusion Imaging

- Introduced in 1991
- Developed at MIT as a cardiac imaging agent
- Technetium-99m sestamibi
- Licensed by DuPont, sold as Cardiolite



History

Scintimammography

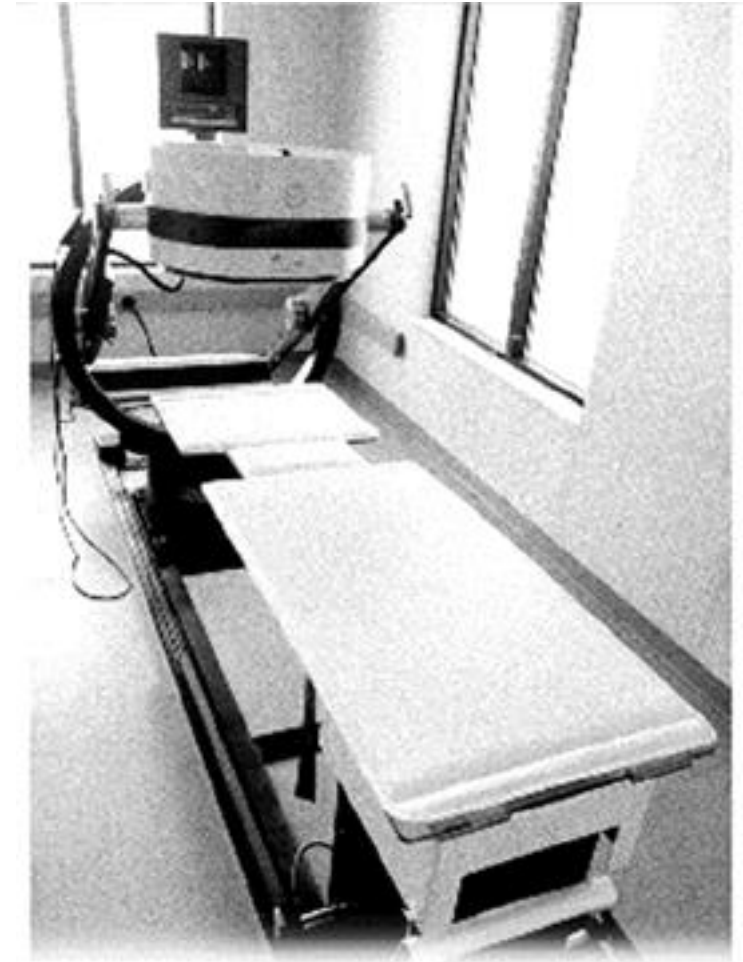
- Focal uptake seen in some women
- Shown to be breast cancer



History

Scintimammography

- Limited success (> 1 cm size)
- Large cameras, patient far from detector



History

JLAB

- NIH requested assistance
- Development continued on-site
- Research prototype completed



History

Dilon Technologies

Cardiolite shown to
enhance breast
lesions

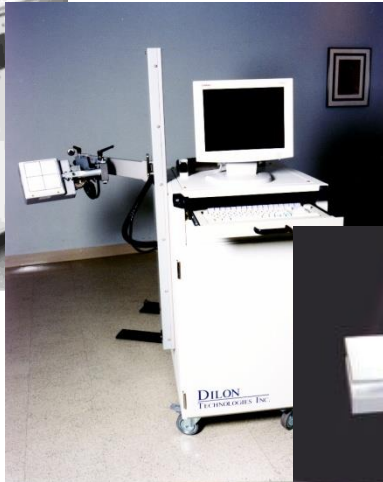
Shortcomings of
conventional gamma
cameras as breast
imagers

Novel gamma detector
developed at Jefferson
Lab



History

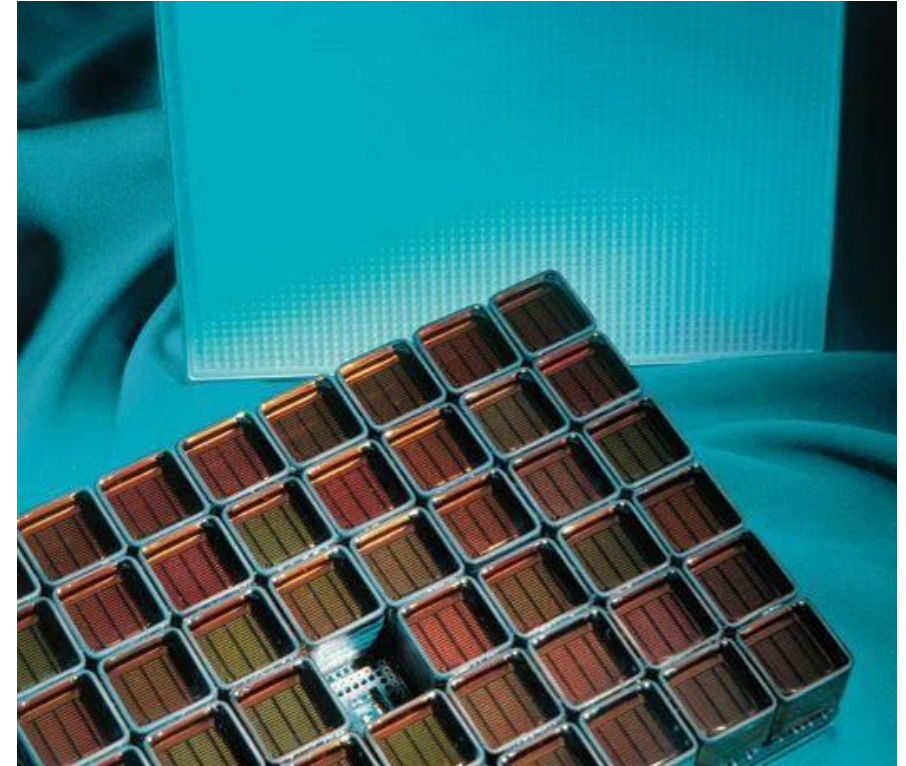
Dilon Technologies – Dilon 6800 camera



Technology

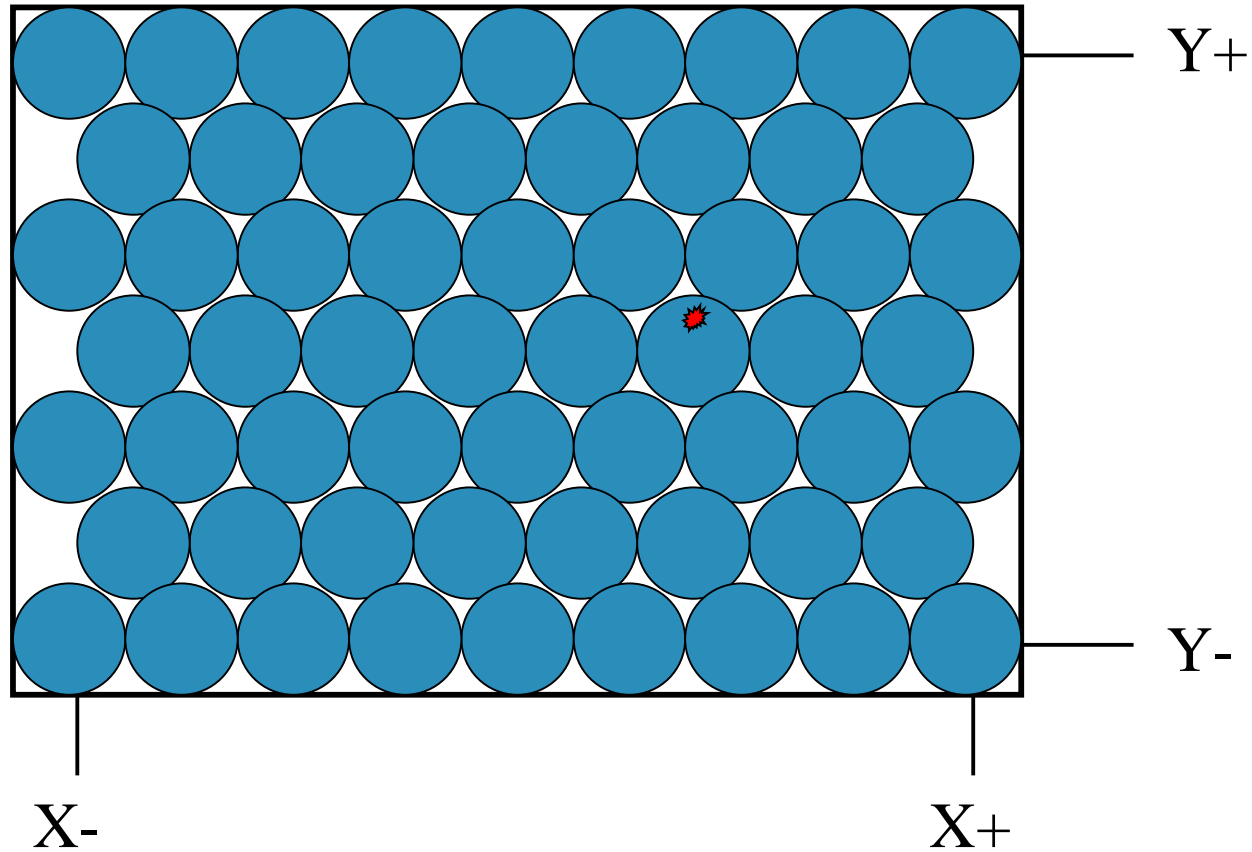
JLAB Licensed Technology

- Position Sensitive Photomultiplier Tube (PSPMT)
 - Resistive (Anger) network
 - 48 x 12 anodes -> 16 channels
- Pixelated NaI(Tl) crystal
 - 64 x 48 pixels
- Calibration software
 - Crystal map
 - Energy map
 - Flood calibration



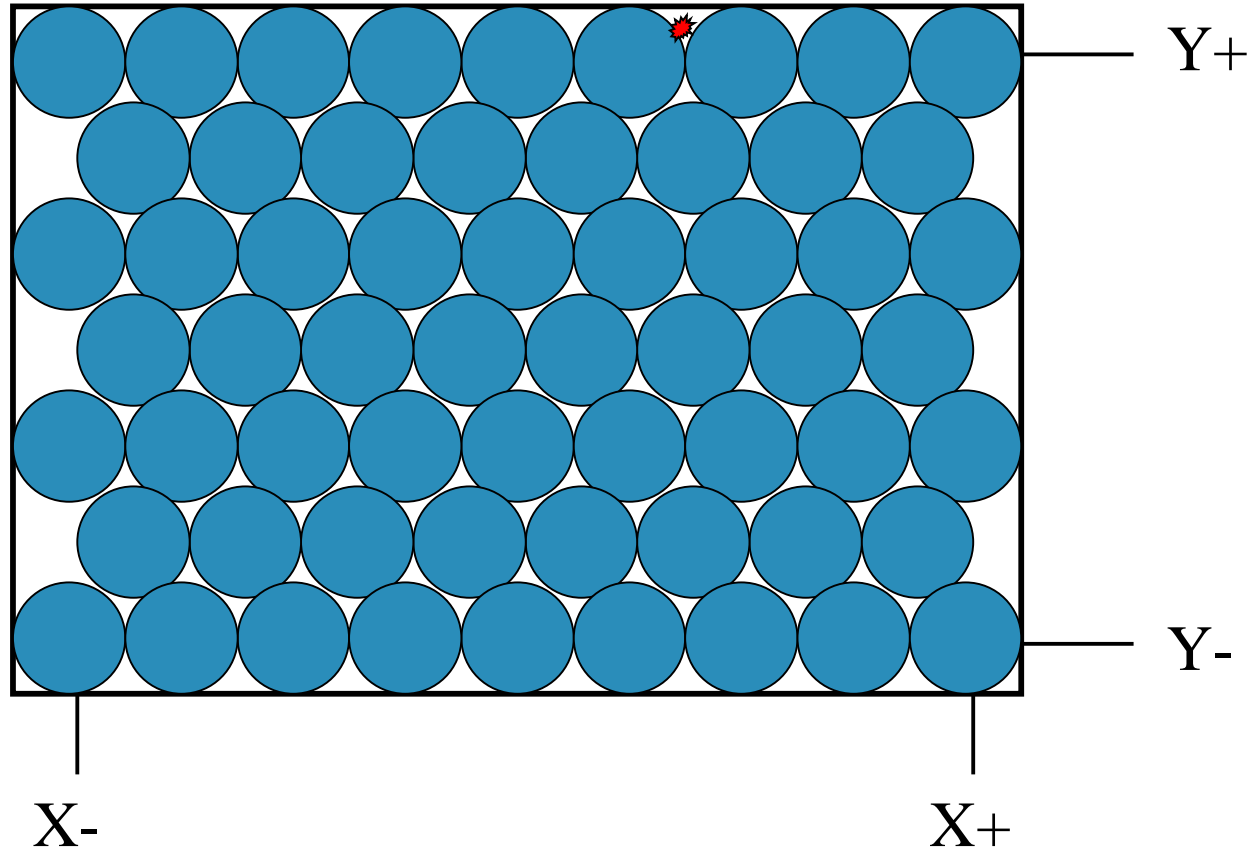
Technology

Standard Anger Camera Technology



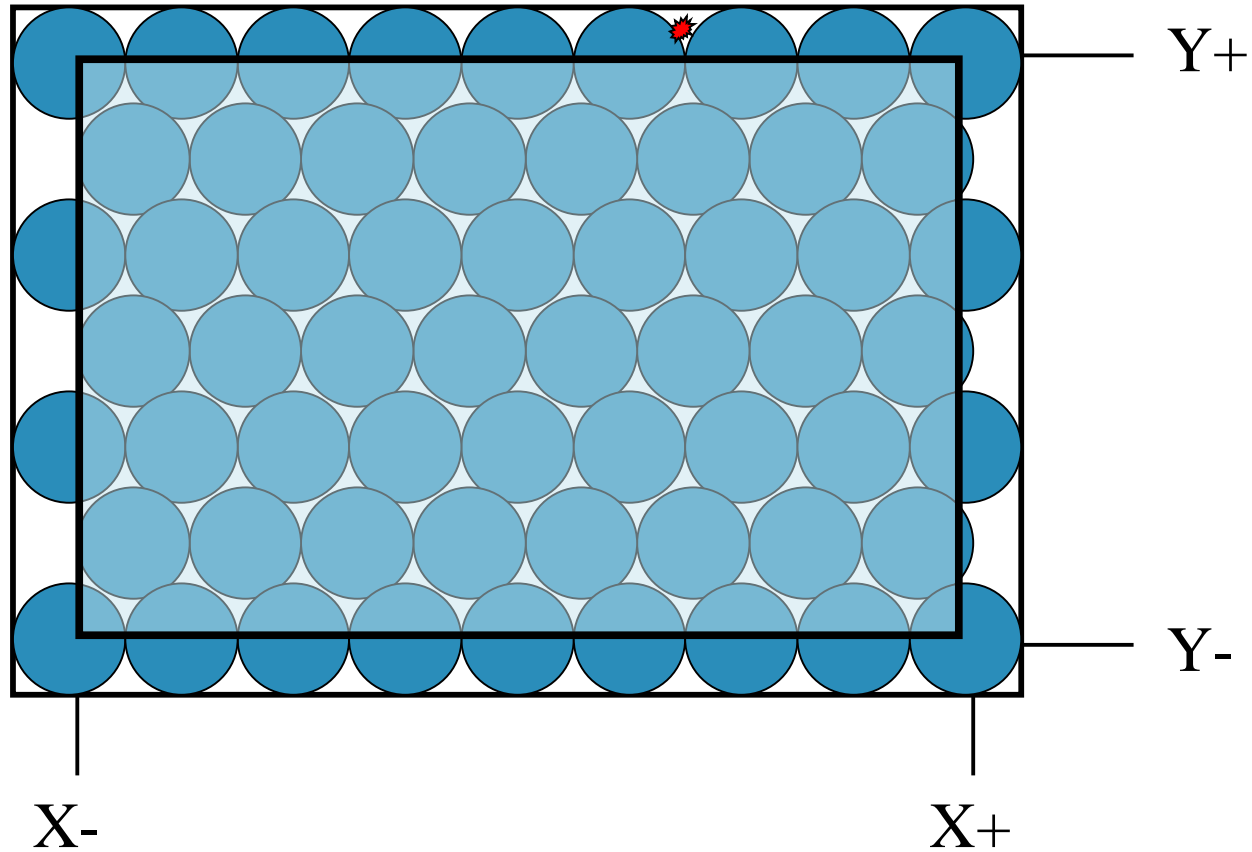
Technology

Standard Anger Camera Technology



Technology

Standard Anger Camera Technology



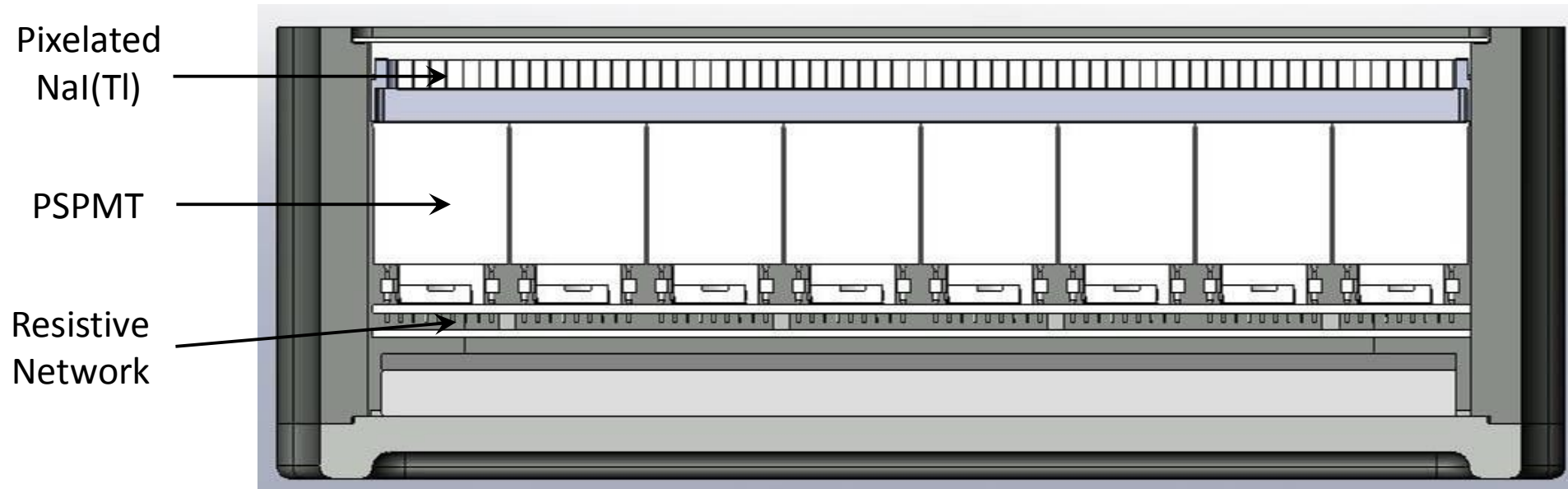
Technology

Standard Anger Camera Technology



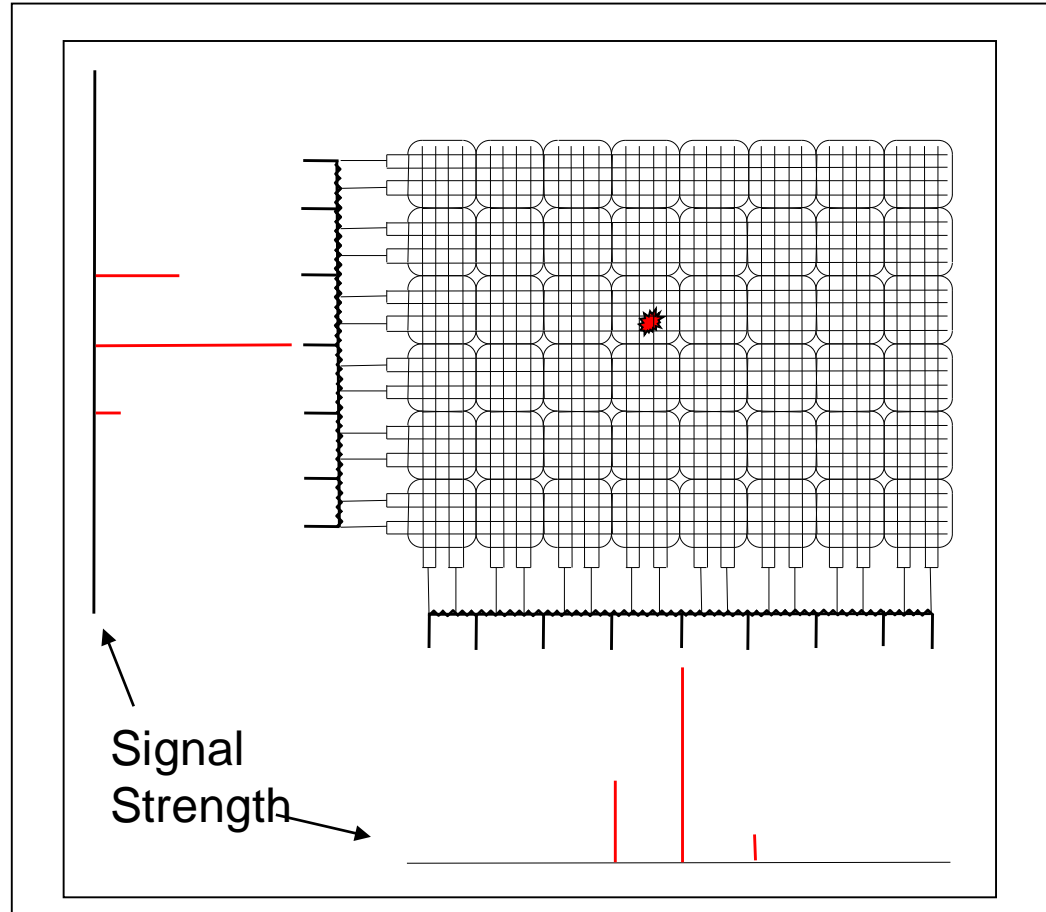
Technology

JLAB/Dilon Camera Technology



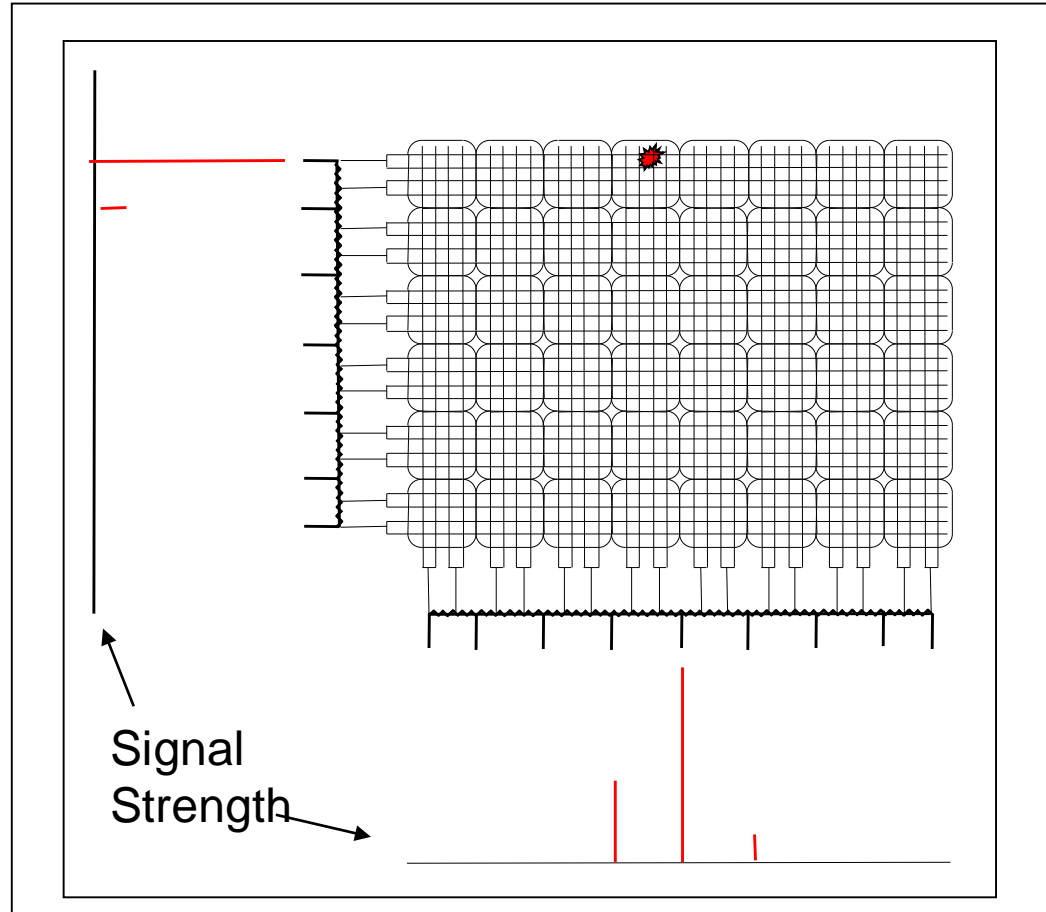
Technology

JLAB/Dilon Camera Technology



Technology

JLAB/Dilon Camera Technology



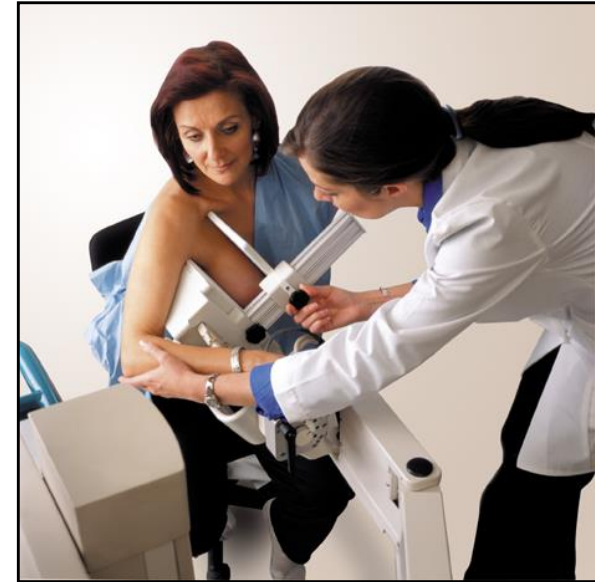
Technology

- Breast placed directly on detector
- Collimator optimized for near field
- Very small “dead-space”
- CC & MLO views can be compared directly with mammogram



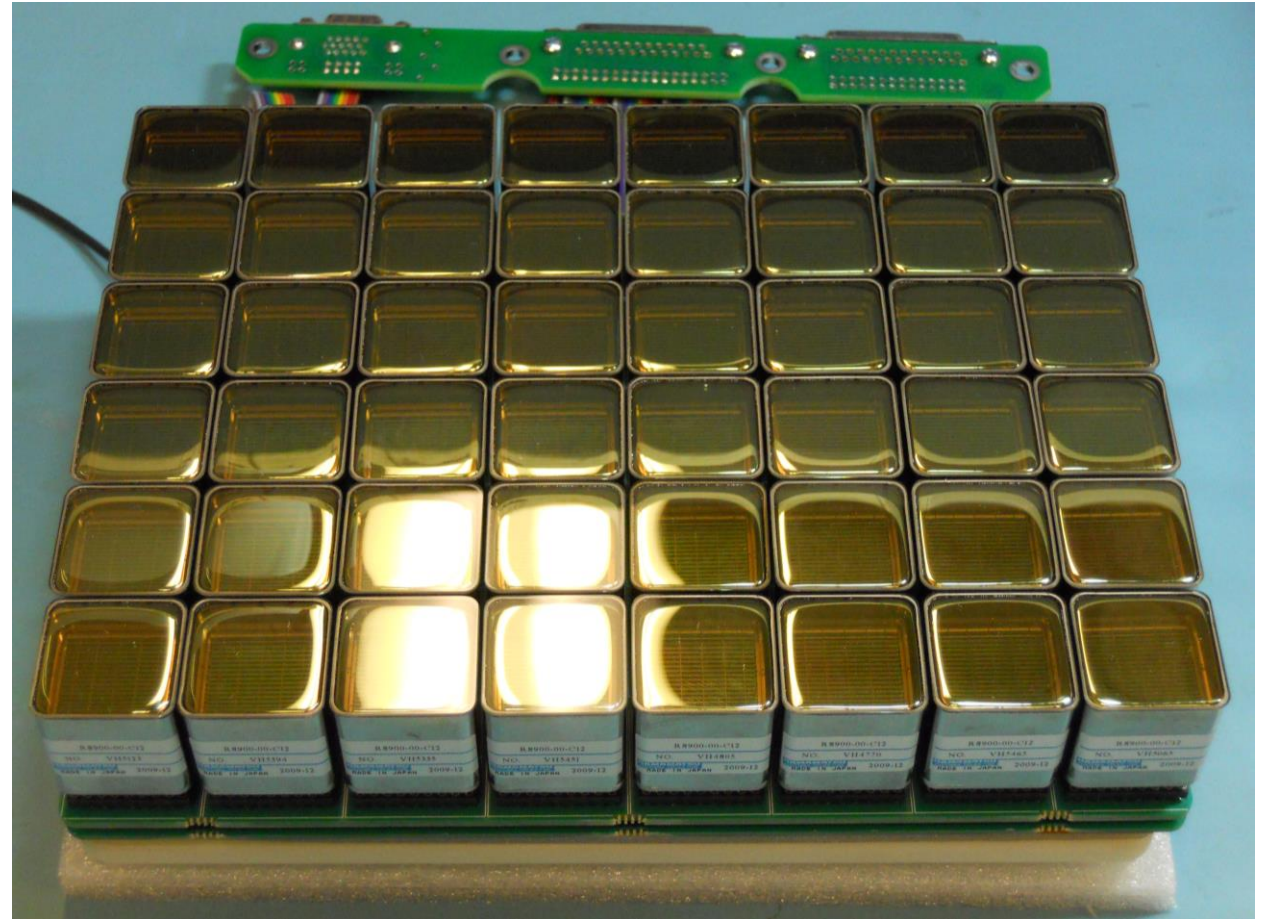
Craniocaudal (CC) View

Mediolateral-oblique (MLO) View



Technology

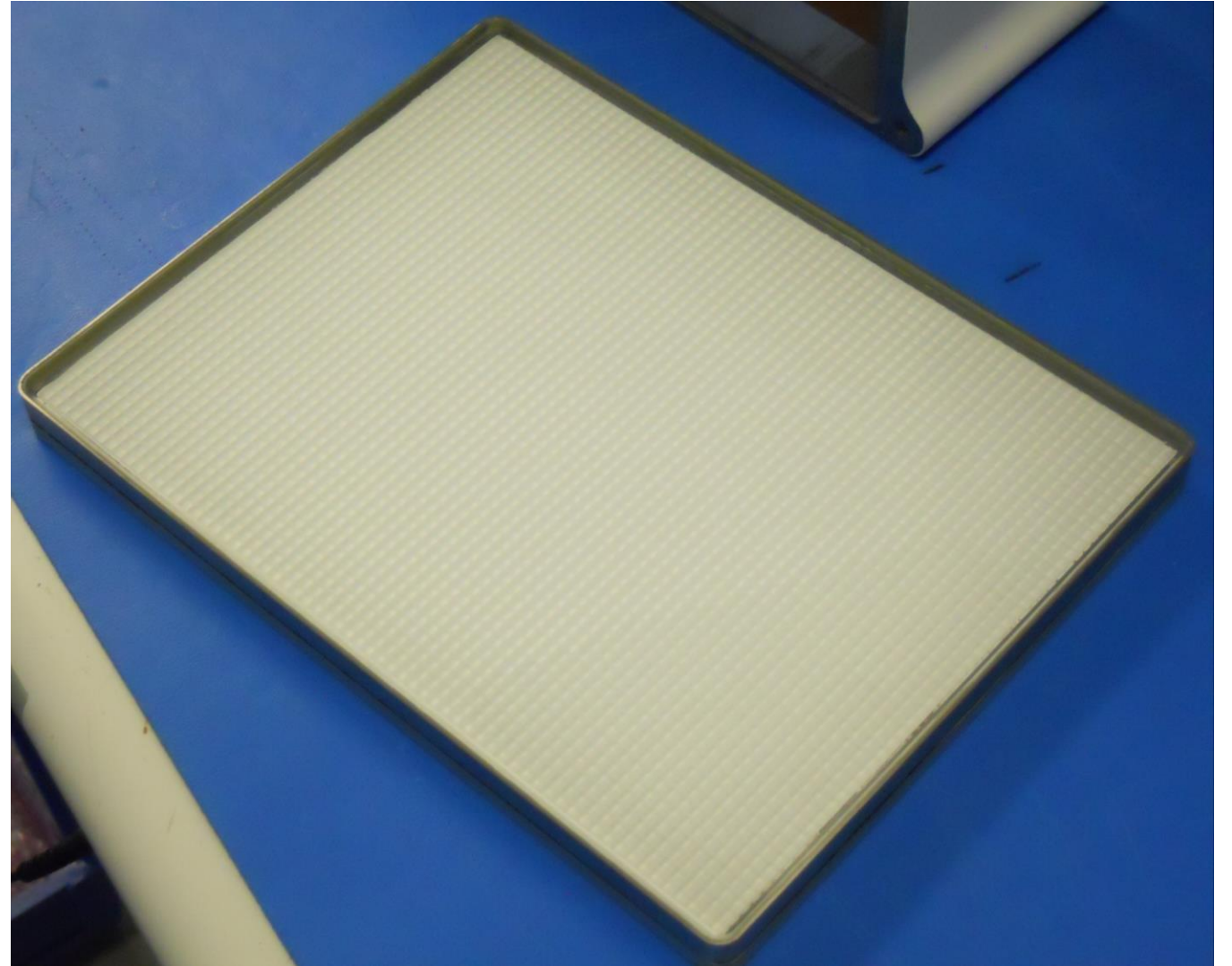
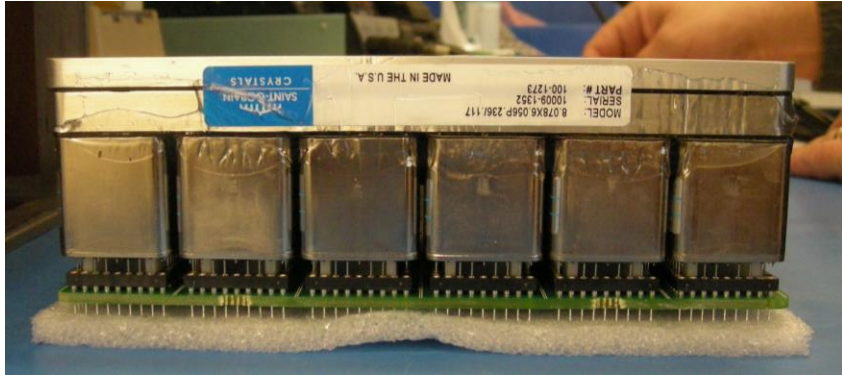
Position Sensitive Photomultiplier Tubes (48)



Technology

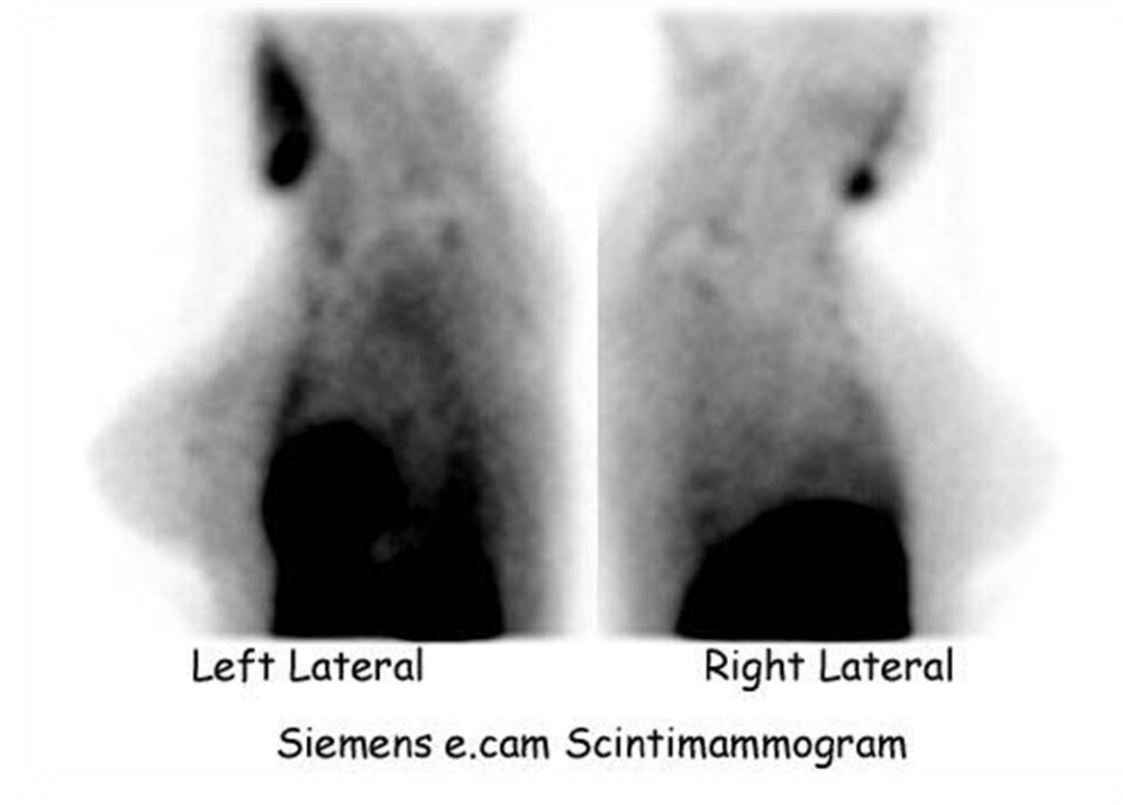
Pixelated NaI(Tl) crystals

48 x 64 = 3072



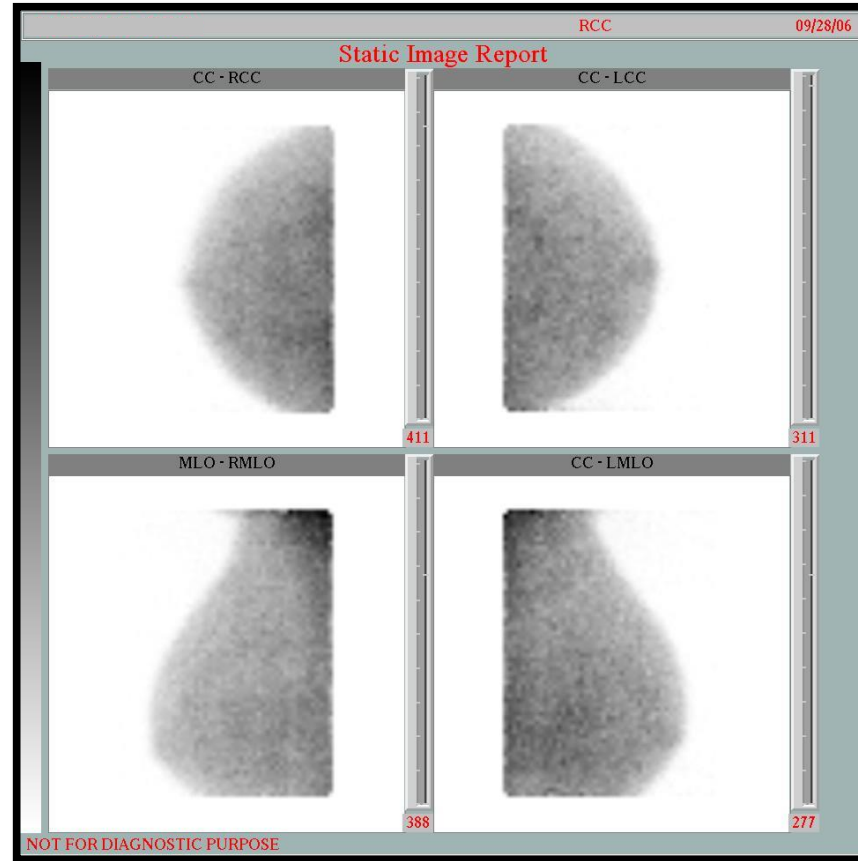
Technology

Standard Anger Camera Image



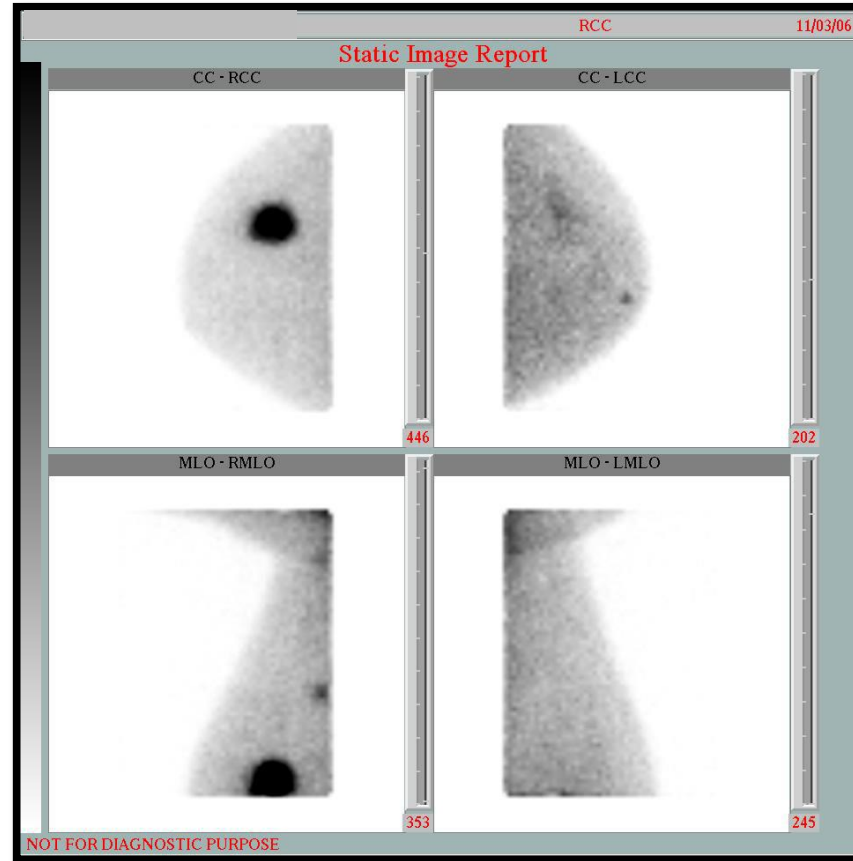
Technology

JLAB/Dilon Camera Image



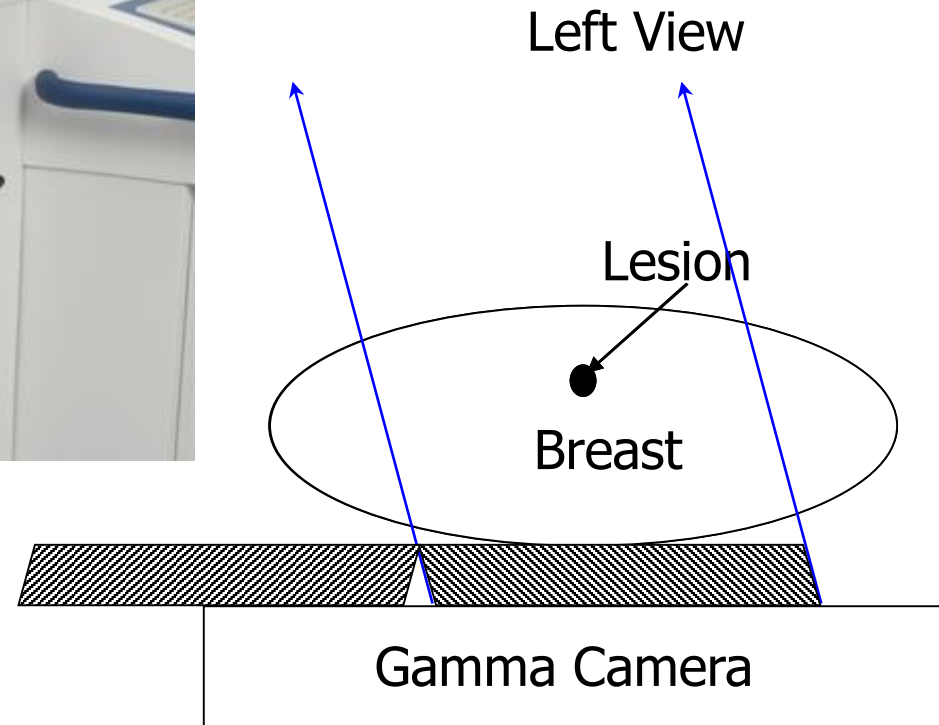
Technology

JLAB/Dilon Camera Image



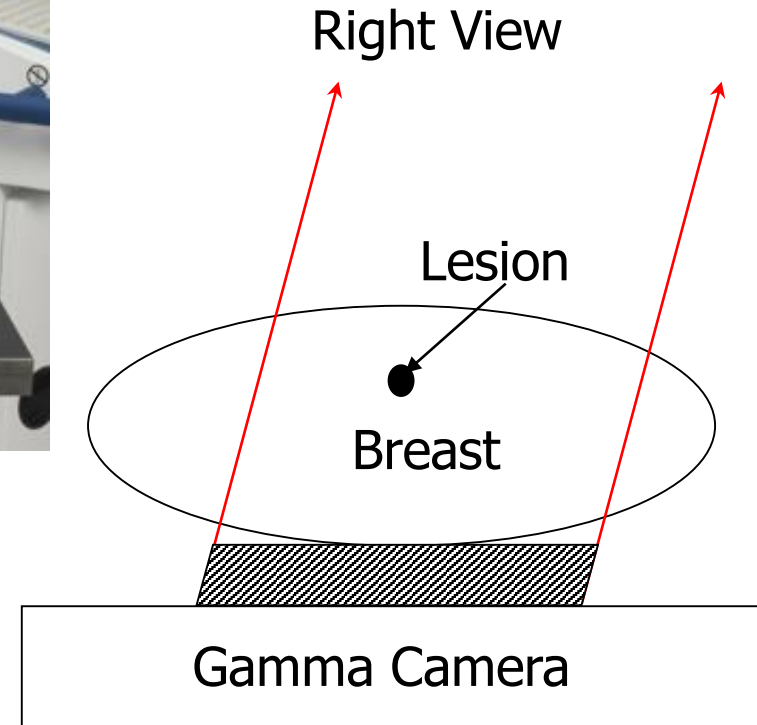
Technology

GammaLoc System with Slant-Hole Collimator for biopsy guidance



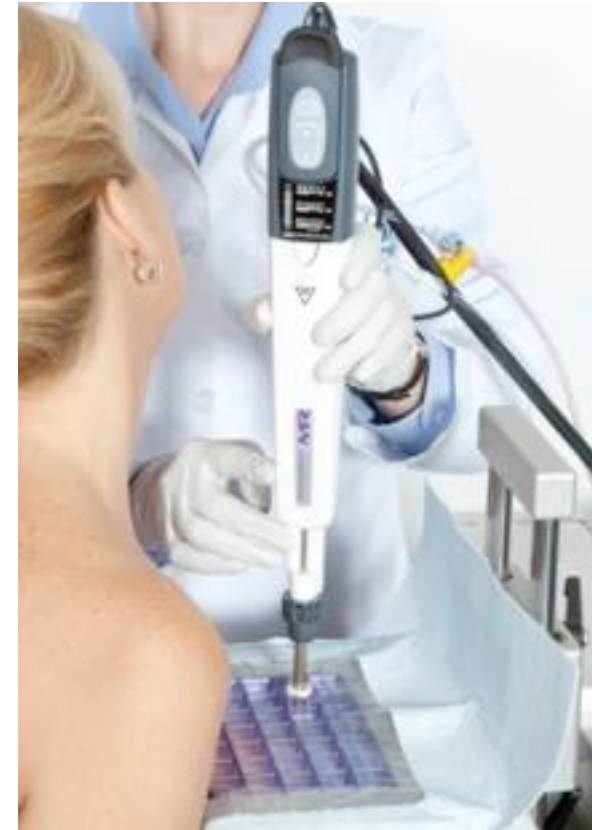
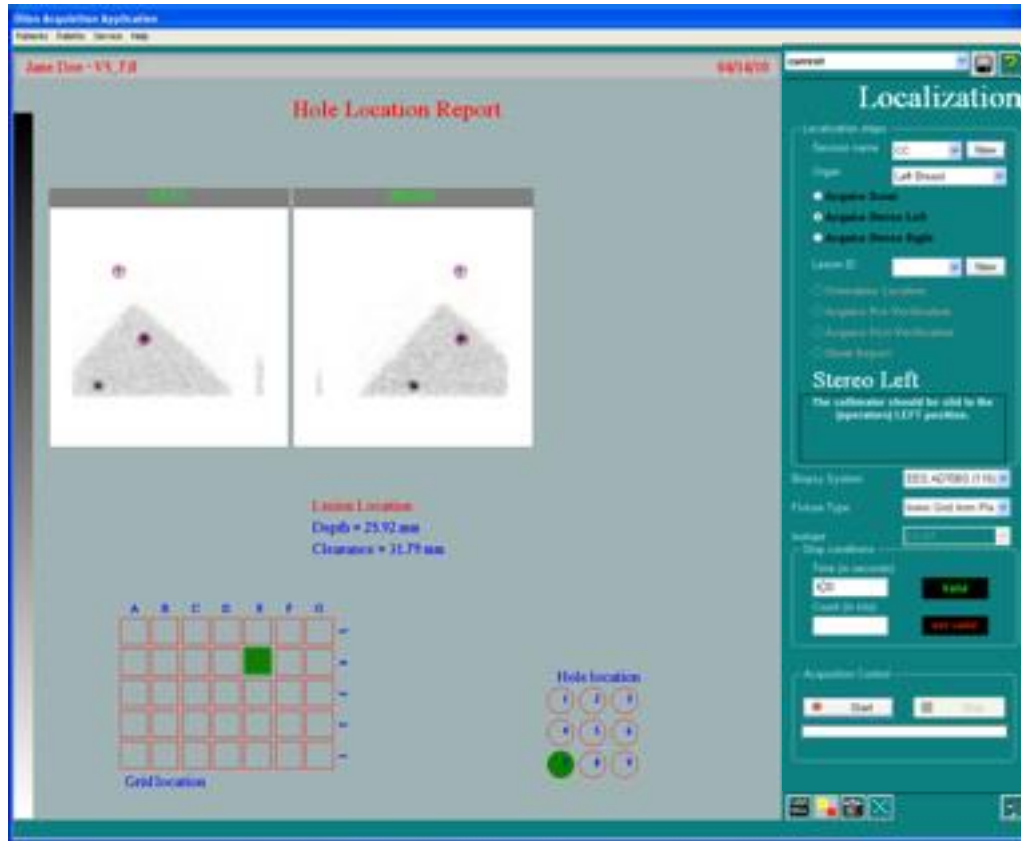
Technology

GammaLoc System with Slant-Hole Collimator for biopsy guidance



Technology

GammaLoc System with Slant-Hole Collimator for biopsy guidance



Timing

- 1996 Company formed to commercialize local technologies
- 1997 Base technology for breast imaging licensed from Jefferson Lab
- 1998 I joined Dilon
- 1999 Clinical testing began, Dilon 6800 510(k)
- 2004 First customer shipment
- 2005 First European Shipment
- 2006 CE Mark
- 2007 First China and Korean shipments
- 2008 100th camera shipped
- 2009 GammaLōc 510(k)

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- 2000 Y2K
- 2001 911
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- 2009 GammaLōc 510(k)
- 2009 ACA passed, med dev tax, insurance denials, radiation concerns, competing technology (Contrast Mammo, Automated Breast Ultrasound)

Timing

- 1996 Company formed to commercialize local technologies
- 1997 Base technology for breast imaging licensed from Jefferson Lab
- 1998 I joined Dilon
- 1999 Clinical testing began, Dilon 6800 510(k)
- 2004 First customer shipment
- 2005 First European Shipment (**16 total**)
- 2006 CE Mark
- 2007 First China (**39 total**) and Korean (**14**) shipments
- 2008 100th camera shipped
- 2009 GammaLōc 510(k)
- 2009 ACA passed
- 2015 ACA enacted

Timing

- 2014 Purchased Navigator Gamma Probe Product
- 2016 Distribution agreement for Discovery NM760b
- 2017 Purchased Laryngoscope Product

Branding

JLAB Licensed Technology

- Dilon 6800 (6" x 8" detector)

Other Licensed Technology

- Naviscan (6800 Smart Shield & GammaLoc)
- U of Michigan (GammaLoc)

Developed Technology

- GammaLoc (Biopsy Guidance)
- Acella (8" x 10" detector)

Branding

Acquired Technology

- Navigator Gamma Probes (2014 RMD)
- CoPilot Video Laryngoscope (2017 Magaw)

Distributed Technology

- DeclipeSPECT Freehand SPECT (SurgicEye)
- Cardius Cardiac Camera (Digirad)
- CoTI I-131 Thyroid Therapy Monitor (AG Medical)
- Discovery NM760b Dual Headed Breast Imager (GE)

Conclusions

Good Technology, with a clinical need

- Innovation lead to smaller size
- Smaller size lead to better results

Diversify

- Markets - requirements
 - US - FDA
 - Europe – CE
 - Asia – In-country testing
 - ISO 13486 / Product testing / continuously changing
- Products
 - Dilon 6800 – Licensed
 - Dilon GammaLoc – Developed
 - Navigator & CoPilot – Purchased
 - DeclipseSPECT, CoTI, Discovery NM760b (GE) - Distribution



Thank You