Probe & Scanner Deficiencies

Appearance in B-Mode Imaging

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Common Probe Failure Modes

- Loss of transducer elements
- Cracked crystals
- Loose backing or facing material
- Broken lens
- Flaws in transducer scan mechanism

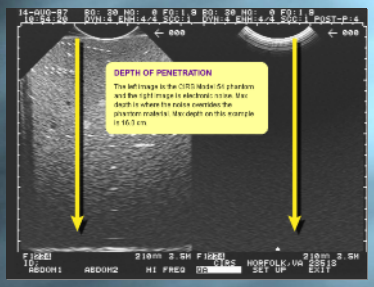
Common Scanner Failure Modes

- Electronic drift of pulser-receiver components
- Variation in output intensity and/or receiver gain
- Loose connections in beam former plug-in board
- Drift or failure in systems internal timing circuits
- Input power fluctuations
- Longer excitation pulse

QA Measurements

- Depth of Penetration
- Image Uniformity
- Distance Measurements
- Axial Resolution
- Lateral Resolution
- Dead Zone

Depth of Penetration



Depth of Penetration

- Damaged transducers
- Damaged cables
- Electronic drift in pulser-receiver components
- Variation in output intensity and receiver gain

Image Uniformity

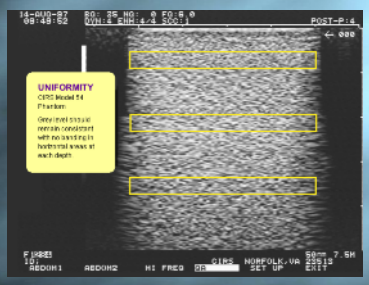
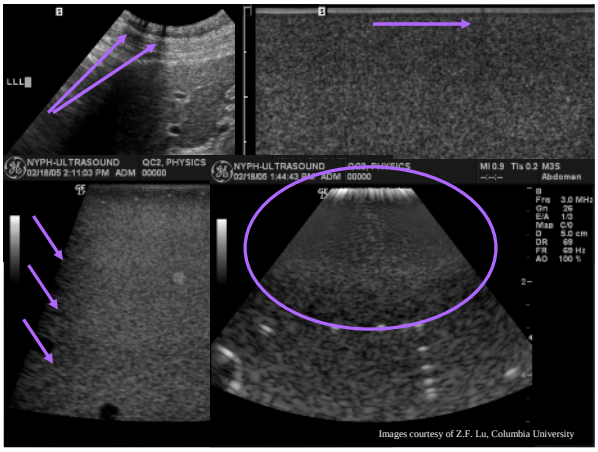


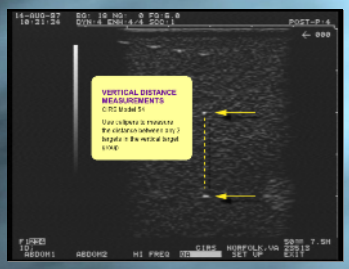
Image Uniformity

- Vertical Banding
  - Bad transducer elements
  - Loose connection in beam former plug-in board
- Horizontal Banding
  - Inadequate side-to-side compensation
  - Inadequate blending of pixel data between transmit and receive focal zones



Images courtesy of Z.F. Lu, Columbia University

Distance Measurements



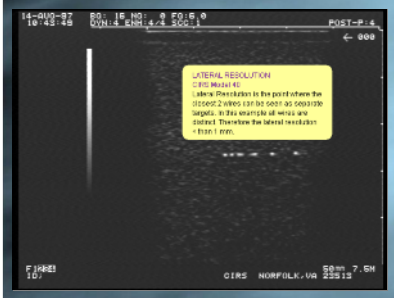
Distance Measurements

- Vertical
  - Drift or failure in system's internal timing circuits
- Horizontal
  - Flaws in transducer scan mechanism

Axial Resolution

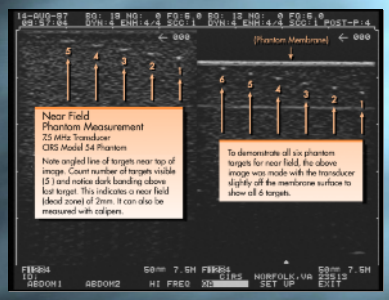
- Damaged transducers
- Changes in pulser/receiver characteristics
- Changes in system setup

Lateral Resolution



- Loss of transducer elements
- Problems in system's beam-forming and receiving circuits

Dead Zone

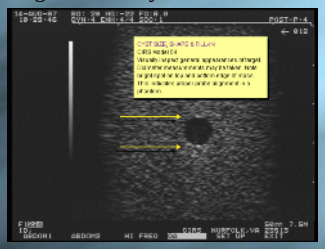


Dead Zone

- Elongated pulse length
- Cracked crystal
- Loose backing or facing material
- Broken lens
- Longer excitation pulse
- Input power fluctuations

Mass Resolution

Combination of spatial and contrast resolution and image uniformity



Mass Resolution

- Electronic noise
- Side lobes in the transducer beam
- Problems in the image processing hardware

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