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Electromagnetic Imaging

Progress and Proposed Work

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Proposed Work Areas

Setup Imaging Array at SNL

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- Received shipment of signal generator, 6 multiplexer modules, and data logger
  - Awaiting arrival of 6 terminal blocks and multifunction switch/measure unit
  - Waveform amplifier and 2 lock-in amplifiers to be ordered
- Obtained suitable PC
    - Intel Xeon E5-1620 quad-core CPU @ 3.6 GHz
    - 32 GB RAM
    - NVIDEA Quadro 4000 graphics card
    - 256 GB internal SSD and 1TB External storage
    - MATLAB installed, LabView to be purchased
- Tentative lab space identified
  - Space should be accessible to unescorted AWE visitors during normal business hours

Proposed Work Areas

Validation Measurements

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- Duplicate a subset of AWE experiments to validate setup
  - Basic shapes
  - Coin
  - Coin in box
  - Other suggestions?
- Scan over larger array of frequencies
  - Determine frequency dependent response of images
  - Determine frequency dependent response of different materials
  - How difficult is this?
- Model simple experiment with software
  - Model basic shapes
  - Simulations involving shielding?

Proposed Work Areas

Advanced Measurements

- Measurements of objects at different standoffs
  - Compare to corresponding models
  - Explore more advanced reconstruction techniques
- Measurement of SNM
  - DU alloy
  - HEU of different enrichments
- Detection of objects concealed in wall cavities
  - Explore potential for handheld device to locate contraband
  - Imaging through different materials: wood, dry wall, concrete, brick, etc.

*These measurements will likely take place after the close of FY17