



# Development of Augmented Reality Technology for Nuclear Criticality Safety Applications

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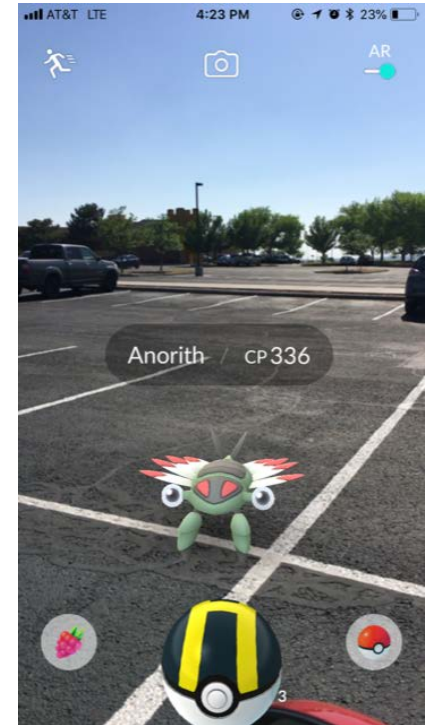
# Overview

- Augmented Reality (AR) Systems
- Benefits of AR in a Nuclear Facility
- Goal for AR in Criticality Safety
- Los Alamos National Lab (LANL) AR Work
- Possible Issues
- Future Development

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# AR Systems

- Superimpose computer images on a user's view of the real world
  - Usually accomplished with a headset or cell phone
- Casual and Commercial Applications
- Various sensor arrays and input techniques can be used



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# Benefits of AR in Nuclear Facility



- AR would allow for easy access to:
  - Procedures
  - Safety documentation
  - Material Information (type, mass, location, etc.)
  - Instructional videos
  - Etc.
- Would allow for:
  - Real-time Material tracking
  - AR criticality safety demonstrations and training
  - Viewing of Operations from another location

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# Benefits of AR in Nuclear Facility (Cont.)

- AR system could assist in planning material moves
  - System checks proposed move against NCS Requirements of path

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✓ Planned Material Move Approved

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IDC: M\_ Item Description: Metal  
Item Name: CAN-01  
SubMBA: XX Location: Room 8/G-7 NetWt: XXX  
Material Name: MT Element Wt: ISO Wt: Project ID: A.Method  
CAN-01 52 100 g XXX XXX Balance

**Note:** The documents and facility layout shown above are fictional and are for training purposes only.

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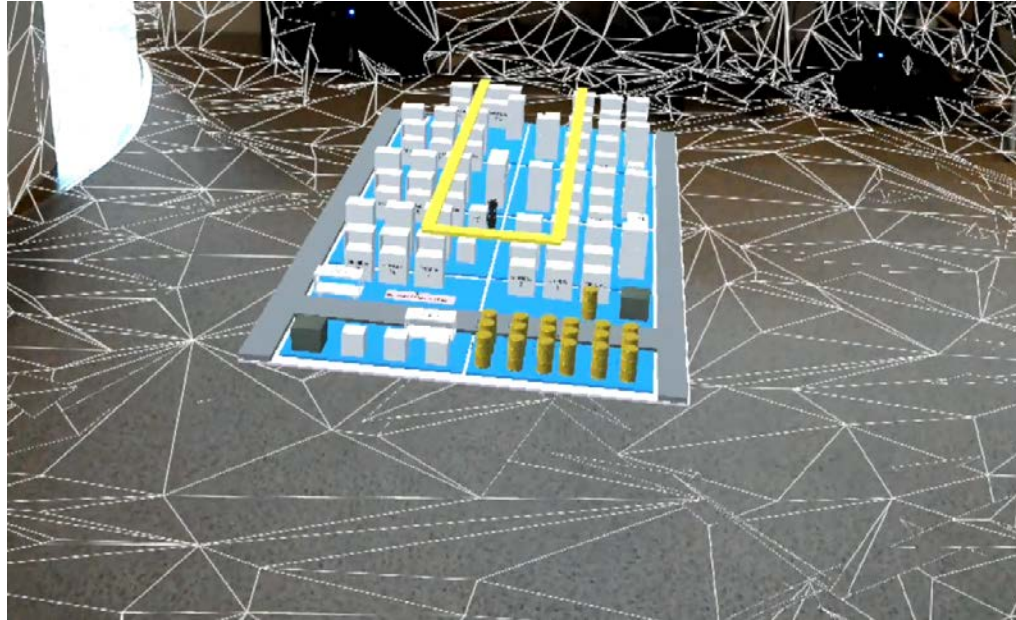
# Goal for AR in Criticality Safety



Reduce administrative Criticality Safety violations by augmenting human senses with real-time data.

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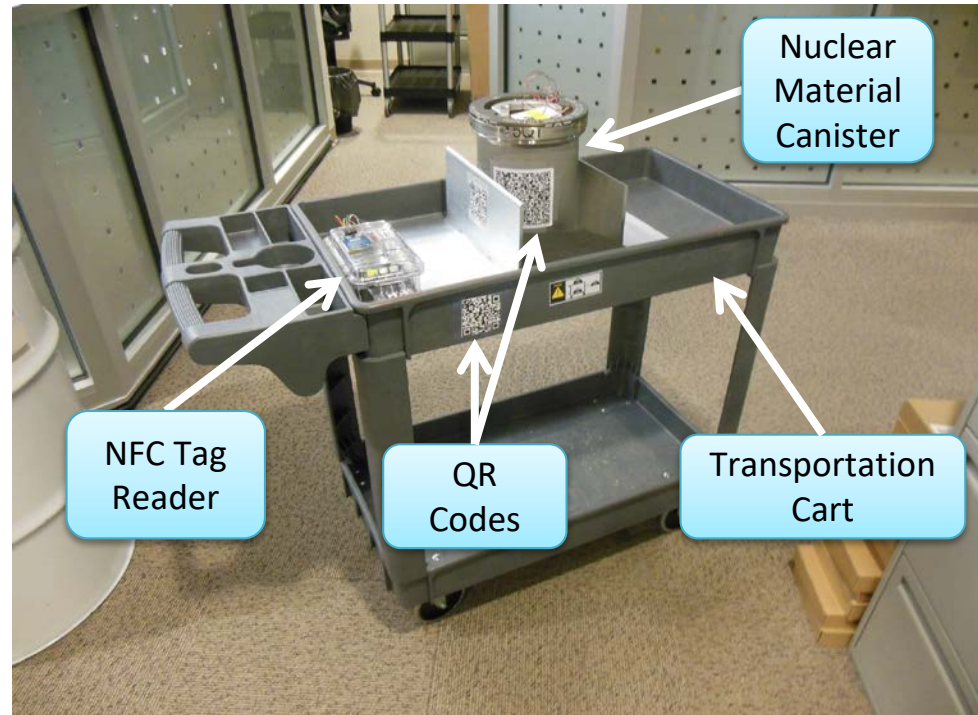
# LANL AR Work



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# Smart Infrastructure

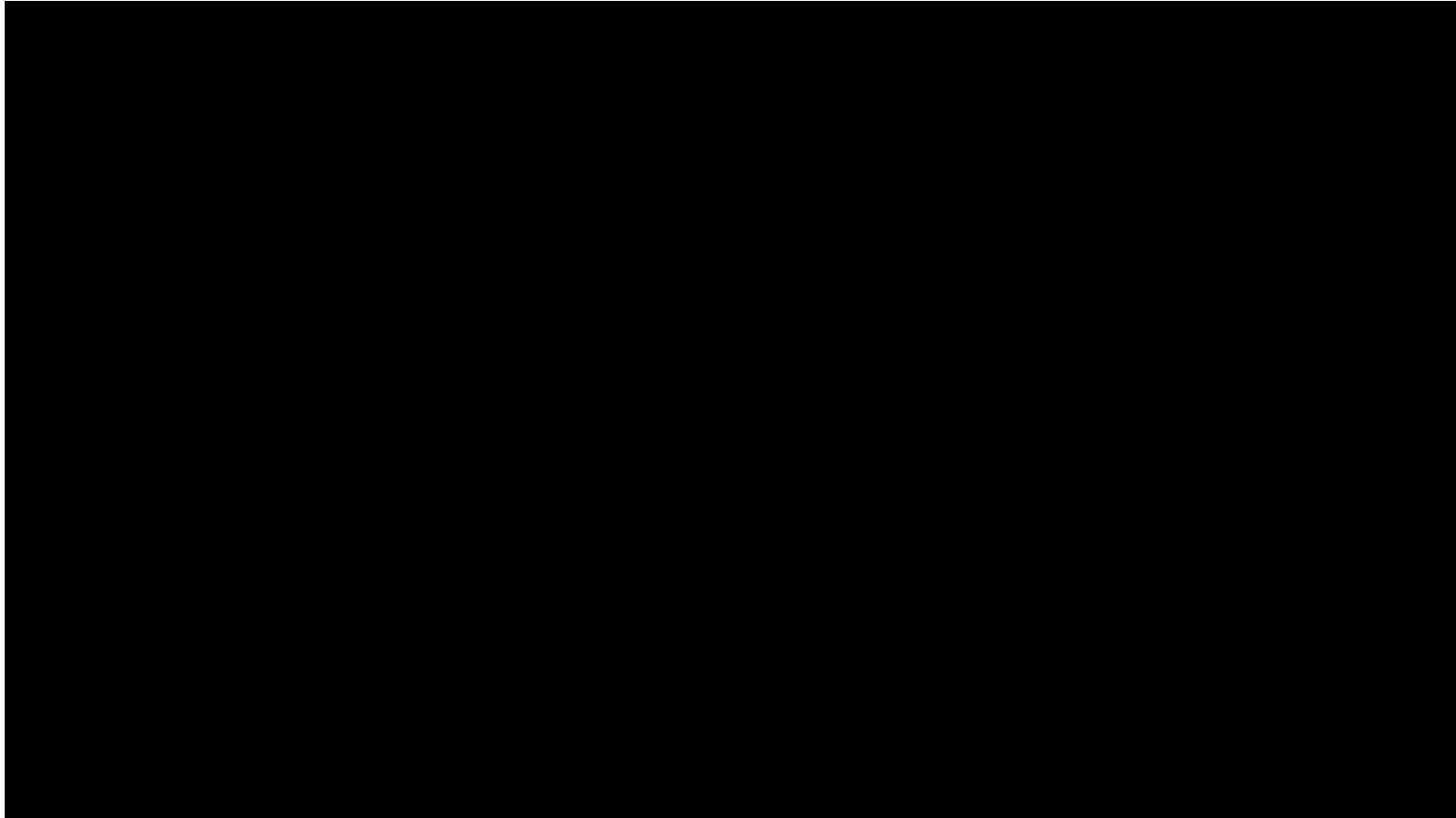
- Developed a Smart Nuclear Infrastructure in a mock facility.
  - HoloLens to interact with facility
  - Quick Response (QR) Codes to access information
  - Near Field Communication (NFC) tags to identify objects and users



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# Demonstration



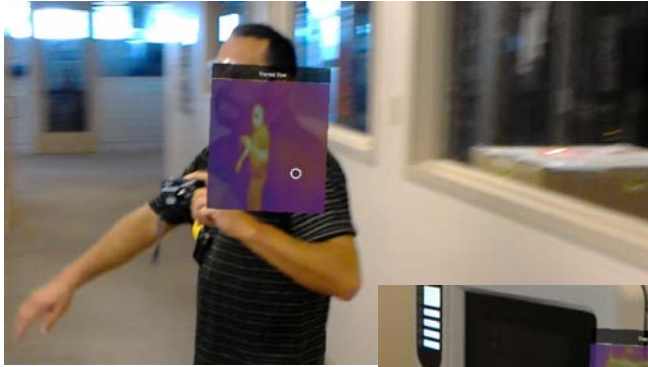
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# Possible Issues

- Security Factors
  - Wifi, Bluetooth, Position tracking/logging capabilities, etc.
- Needs to be tested with real gloveboxes
- Abundance of information might be distracting
  - Need to work with human factors specialists in designing display

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# Future Development



- Scan glovebox for material heat signatures
- Log and track infrastructure issues
- Tracking of workers and carts within the facility
- Possibilities are endless

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# Acknowledgements

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# QUESTIONS?

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