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Title: Development of Augmented Reality Technology for Nuclear Criticality Safety Applications

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Development of Augmented Reality Technology for Nuclear Criticality Safety Applications

Presented by Austin Meredith, LANL Criticality Safety Analyst

06/17/2018

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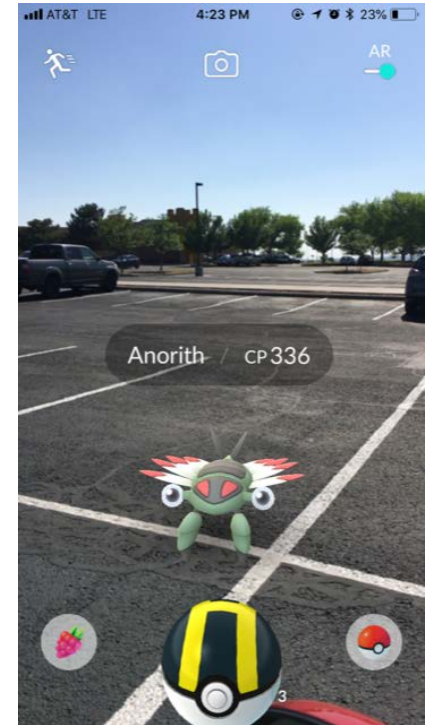
Overview

- 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

✓ Planned Material Move Approved

FOR TRAINING USE ONLY
SLIP PRINTOUT

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
CAN-01	52	100 g	XXX	XXX
		A.Method Balance		

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

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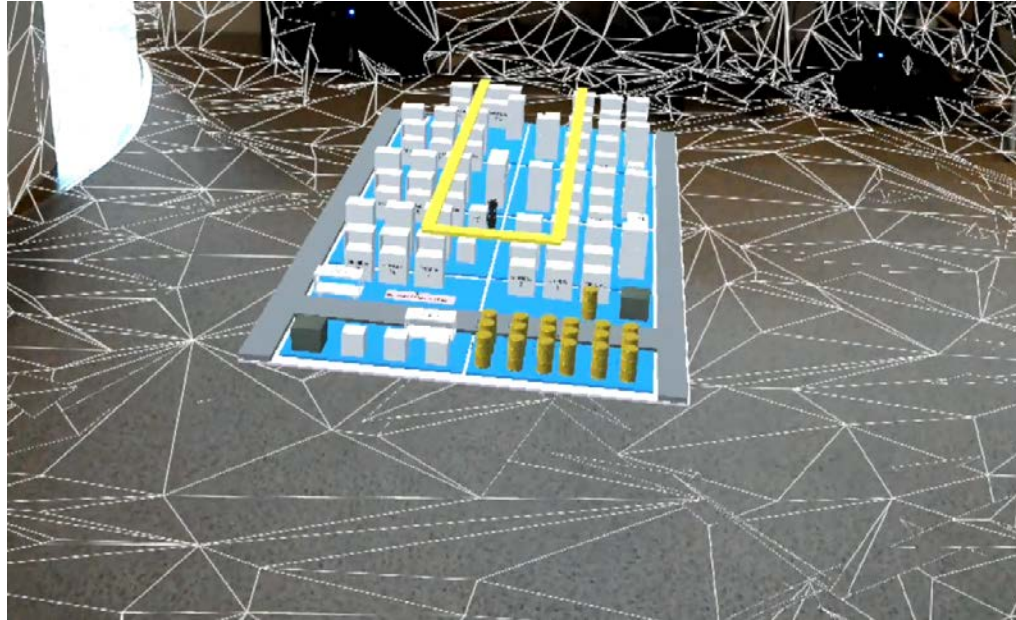
Goal for AR in Criticality Safety



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

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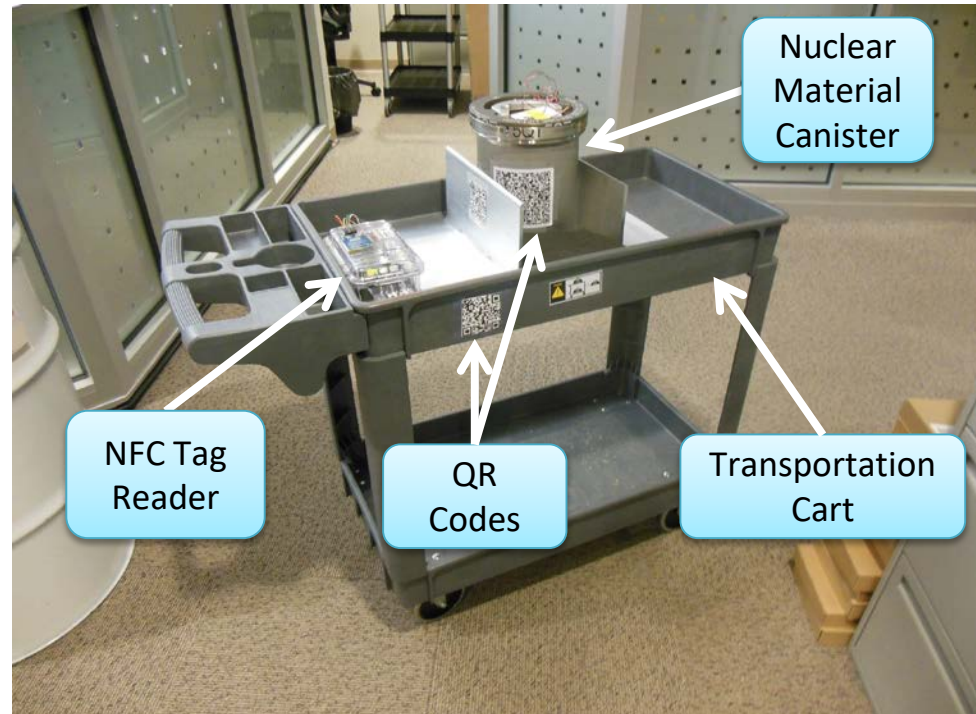
LANL AR Work



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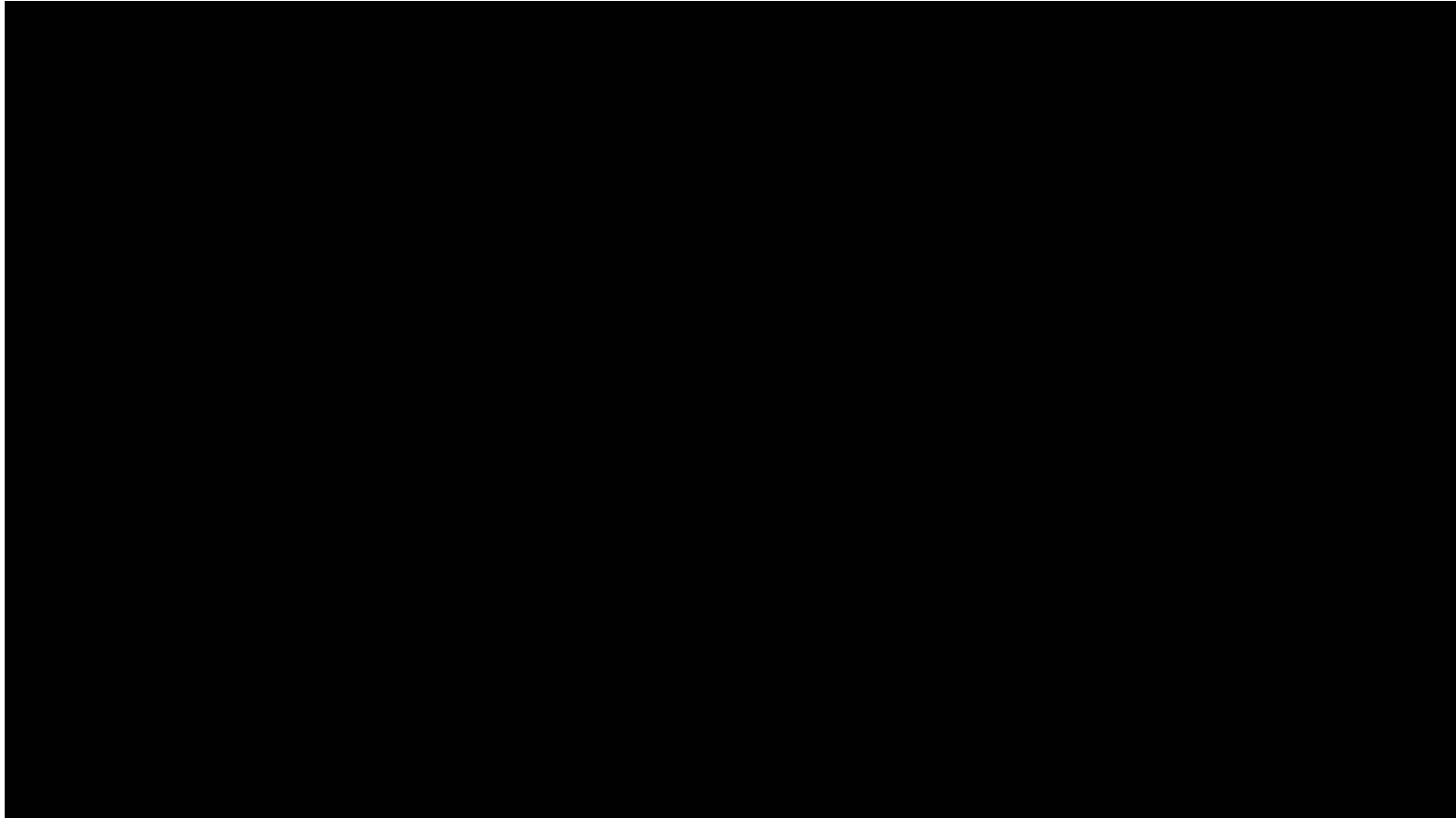
Smart Infrastructure

- 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



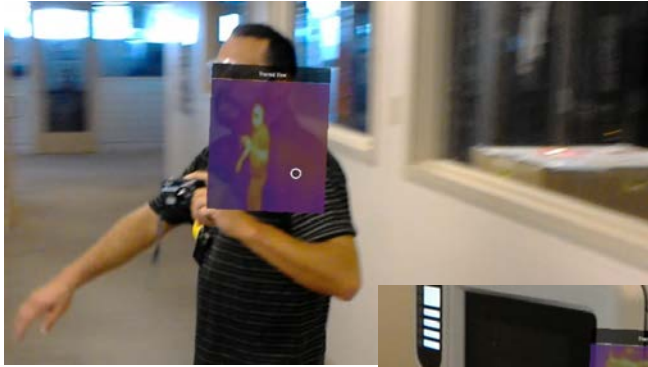
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Possible Issues

- 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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QUESTIONS?

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