Development of Augmented Reality Technology for Nuclear Criticality Safety Applications

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06/17/2018
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
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
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
Benefits of AR in Nuclear Facility (Cont.)

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

Note: The documents and facility layout shown above are fictional and are for training purposes only.
Goal for AR in Criticality Safety

Reduce administrative Criticality Safety violations by augmenting human senses with real-time data.
LANL AR Work
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
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
Future Development

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

• LANL
  Andrew Wysong, NCS Division Leader
  Julio Trujillo, NCS Division CSA

• National Security Education Center Team
  David Mascareñas, John Morales, Brian Bleck, Erin Sosebee, Beth Boardman, Matthew Krebs, Jameson Tockstein, Andre Green, Sudeep Dasari, Benjamin Katko, Craig Blackhart
QUESTIONS?