



CraneMorley

NYSEARCH
Natural Gas RD&D

Improving Gas Operations Training Through Mixed Reality Technology

NGA Spring Operations Conference

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NYSEARCH is a division of the Northeast Gas Association leading industry consortium R&D projects in the following Program Areas:

- Improved Installation, Maintenance, and Repair
- Pipeline Integrity / Direct & Remote Assessment
- Pipe Location
- Leak Detection
- Real-time Sensing & Inspection for Distribution
- Reducing GHG Emissions
- Low Carbon Fuels

Voluntary based project funding
High-leverage of R&D dollars



Ahra Kwon
Senior Project Manager

CraneMorley is an instructional design consulting firm that develops custom training and on-the-job performance solutions to help organizations transform the way they train.

Using:

- Blended Curriculum design
- Web-Based training and eLearning
- Mixed Reality and Virtual Reality Solutions
- Conversational and Generative AI

To:

- Shorten time to competency
- Transfer skills with less instructor time
- Expand training center capacity and throughput
- Empower learners with on-demand guidance

CraneMorley

Microsoft
Partner

Mixed
Reality



Troy Segale
Director, Instructional
Design

CRANEMORLEY CLIENTS INCLUDE

UTILITIES/ENERGY | MANUFACTURING | AUTOMOTIVE | TECH/ HEALTHCARE



MOTIVATION AND BACKGROUND

- Rapid pace of retirement and loss of knowledge (brain drain)
- Accelerate and enhance training for new generation of workers
- The NYSEARCH M2018-006 program demonstrated the ability of Augmented Reality (AR) experienced through Microsoft HoloLens to enhance instructor-led training with **self-paced eLearning, video, digital imagery, mock scenarios, and simulations for various tasks to gas company training programs**



MOTIVATION AND BACKGROUND



NYSEARCH began pilot program with first generation Microsoft HoloLens in 2017



A need was identified for efficient and engaging gas ops training as retirements increase and knowledge is lost



Identified CraneMorley as a leader in the space of instructional design and piloting new digital technologies that transform the learning experience



Currently developing common digital asset library and delivered specific gas operations training procedures with each utility funder using the second generation (newest) Microsoft HoloLens

Top 5 priorities for HR leaders in 2022

We surveyed more than 500 HR leaders across all major industries to assess their priorities and expected challenges in 2022. Building critical skills and competencies tops the list, but many HR leaders will also prioritize change management, leadership, and diversity, equity and inclusion (DEI) initiatives.

- 40% of HR leaders say they cannot build skill development solutions fast enough to meet evolving skill needs
- AR technologies offers a potential solution to close this gap

01 Building Critical Skills and Competencies

59% of HR leaders prioritizing

02 Organizational Design and Change Management

48% of HR leaders prioritizing

03 Current and Future Leadership Bench

45% of HR leaders prioritizing

04 Future of Work

42% of HR leaders prioritizing

05 Diversity, Equity and Inclusion

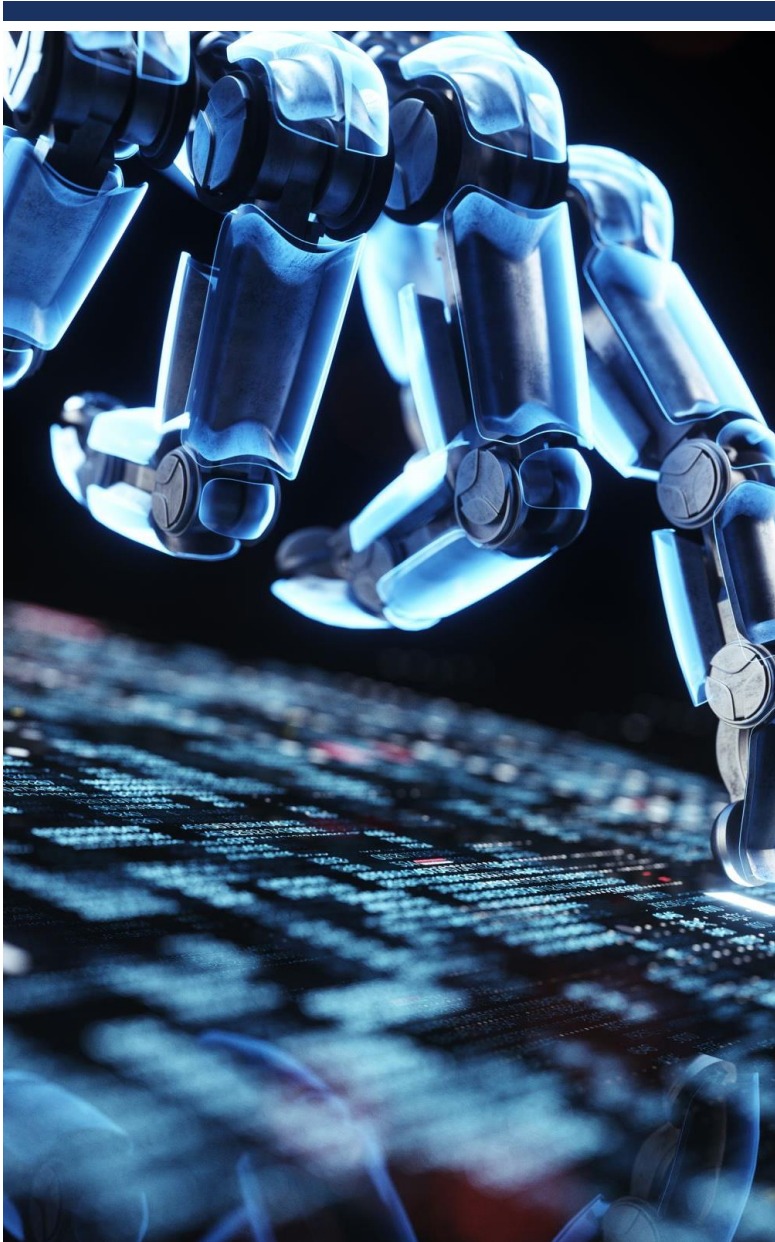
35% of HR leaders prioritizing

n = 572 HR leaders

Source: 2022 Gartner HR Priorities Survey; for more on demographics, see Page 23.

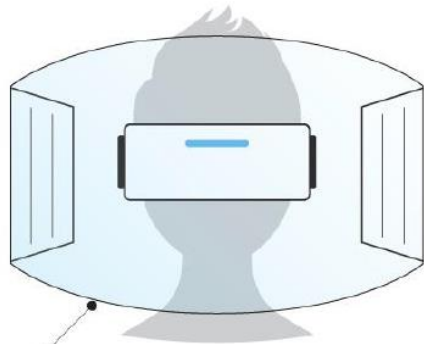
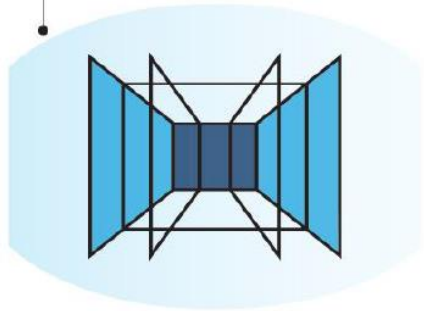
OBJECTIVE OF THE PROJECT

- Fulfill gas ops roles with higher efficiency and speed using emerging technologies that newer generations of workers appreciate and embrace
- Answer the question: Can these new technologies can help close the skill gap faster when combined with traditional training methods?
- The belief is that Mixed Reality technologies such as the Microsoft HoloLens will be instrumental in closing the skill gap that is responsible for the shortage of skilled workers
- Simultaneously, a large number of retirements and turn-over from the COVID-19 pandemic have expanded the need to bring in a new, younger workforce that needs a high degree of training, certification by various entities, and operator qualification



VIRTUAL REALITY (VR)

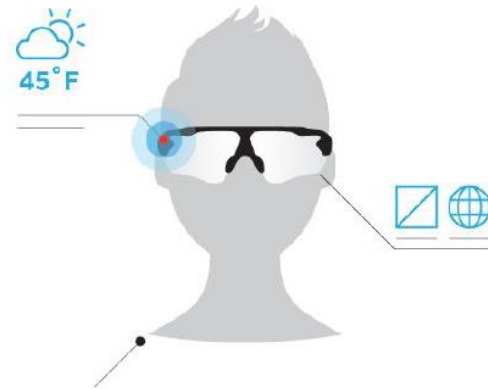
Completely digital environment



Fully enclosed, synthetic experience with no sense of the real world.

AUGMENTED REALITY (AR)

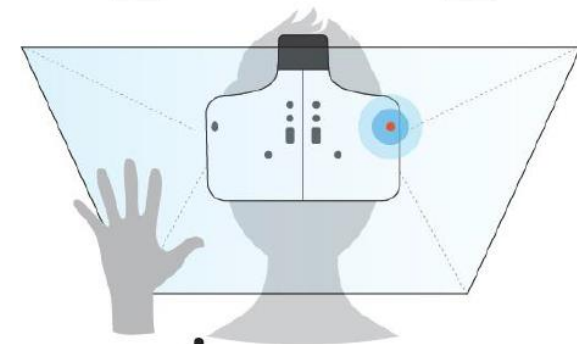
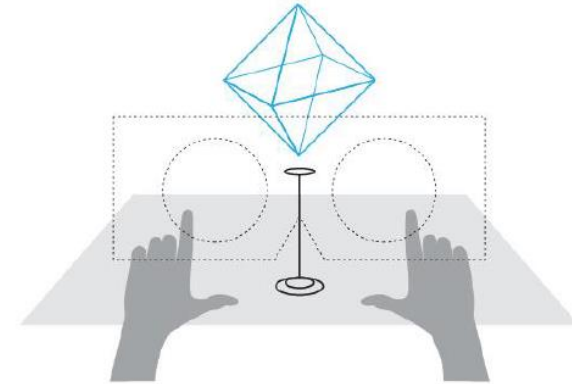
Real world with digital information overlay



Real world remains central to the experience, enhanced by virtual details.

MIXED REALITY (MR)

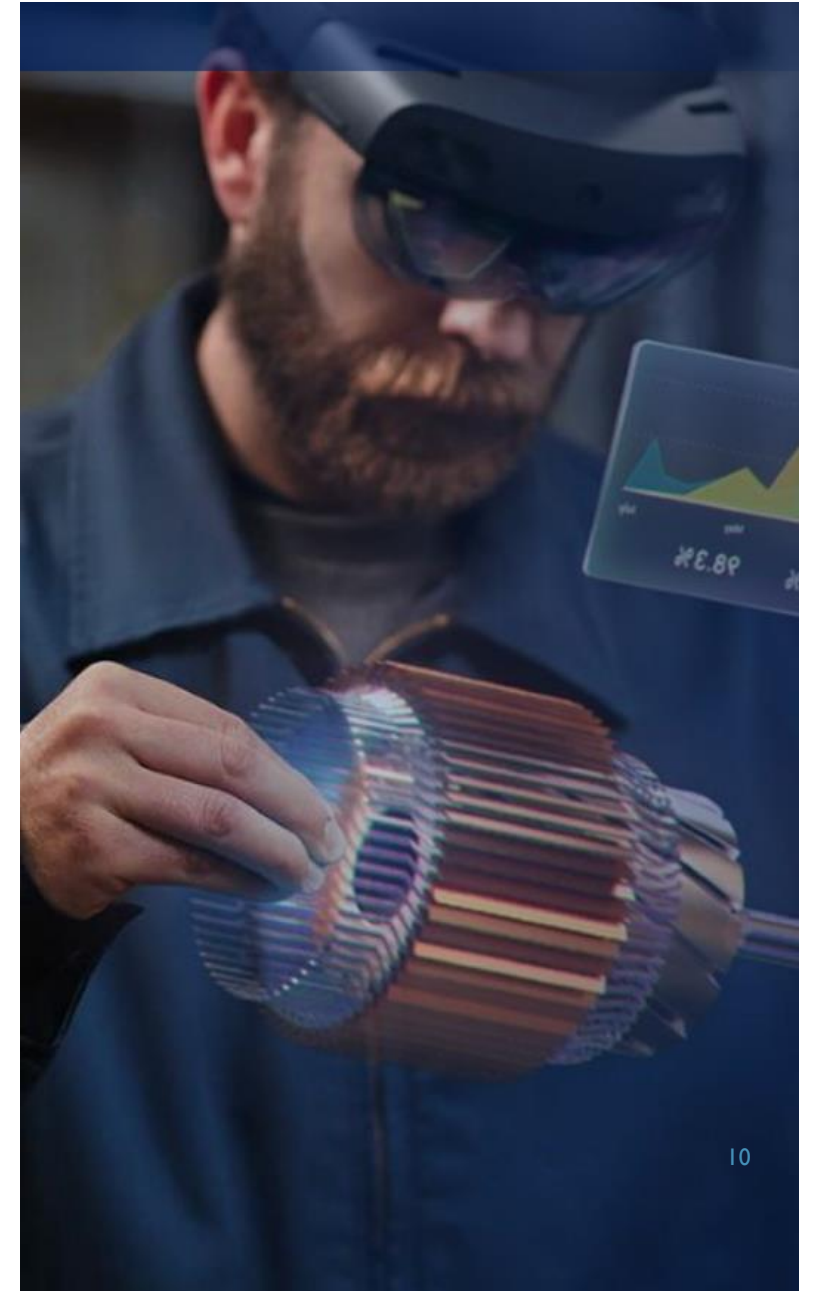
Real and the virtual are intertwined



Interaction with and manipulation of both the physical and virtual environment.

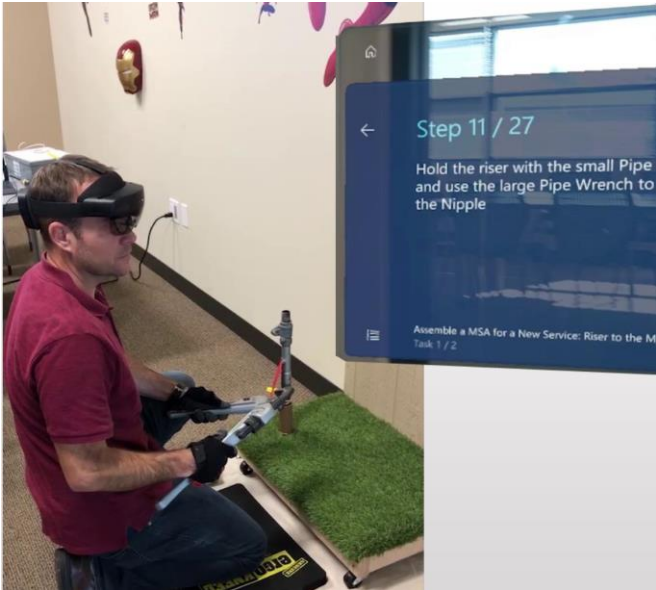
WHAT IS THE HOLOLENS?

- The Hardware (The Headset)
 - A headset that can be used with **mixed reality** applications
- The Software
 - Built-in Functionality
 - Take pictures
 - Record video
 - Check email
 - Browse the web
 - **Microsoft Dynamics 365: Remote Assist**
 - Tech support sees what you see
 - **Microsoft Dynamics 365: Guides**
 - Develop Mixed Reality applications
 - No coding skills required
 - Custom Applications
 - Game engines: Unity, Unreal, etc.



BENEFITS OF MIXED REALITY AND THE HOLOLENS

Step-by-step Instructions and Holograms



- Hands-free, heads-up training
- Allows individuals to have hands-on experience with actual tools and equipment
- Training happens at ground zero at the training center and on the job

Live Remote Support and Collaboration



- Easy access information where operators don't have to stop working to look up details or get information
- Stream video from your headset to others in real-time
- Reach out for advice and assistance while on the job

DYNAMICS 365 REMOTE ASSIST

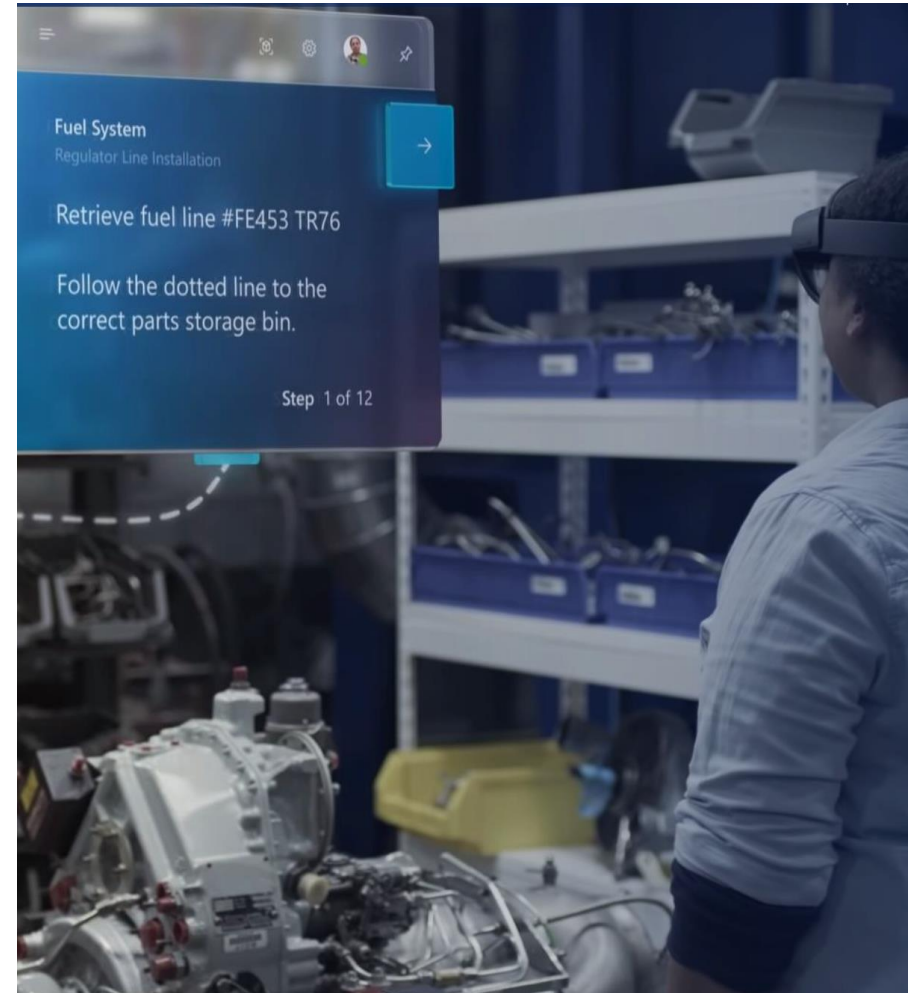


- Solve problems in real-time
- Share files and documentation
- Walk the site without being on location
- Record for future reference



DYNAMICS 365 GUIDES

- Mixed Reality training tool for the HoloLens
- Holograms instruct and lead operators through procedures
 - Step-by-step assembly training
 - Informational systems overviews
- Provides a hands-on, head-up approach to training
- Ideal for Self-Paced, On-the-Job training





NYSEARCH USE CASES

- Southwest Gas – New Residential MSA Installation
- PECO – New Tee Abandonment Tool
- SoCalGas – Virtual Instructor Led training
- Southwest Gas – Line Locate Remote Qualification



Objective: Reduce time to productivity



Classroom Training

4-6 hours class time before getting hands-on



HoloLens - Learn In The Flow Of Work

Step-by-step instructions and holograms overlaid on top of the MSA. Can complete task in 45 minutes



Objective: Tool Training Without The Tool

Tool Not Available For Training

Workers need to know the new Tee Abandonment Tool to be ready for leaks in the field but did not have the tool.

HoloLens – Digital Twin

A full-scale hologram copy of the tool and its components are available for the workers to observe the procedure and understand how the tool works



Objective: Remote Classroom Training

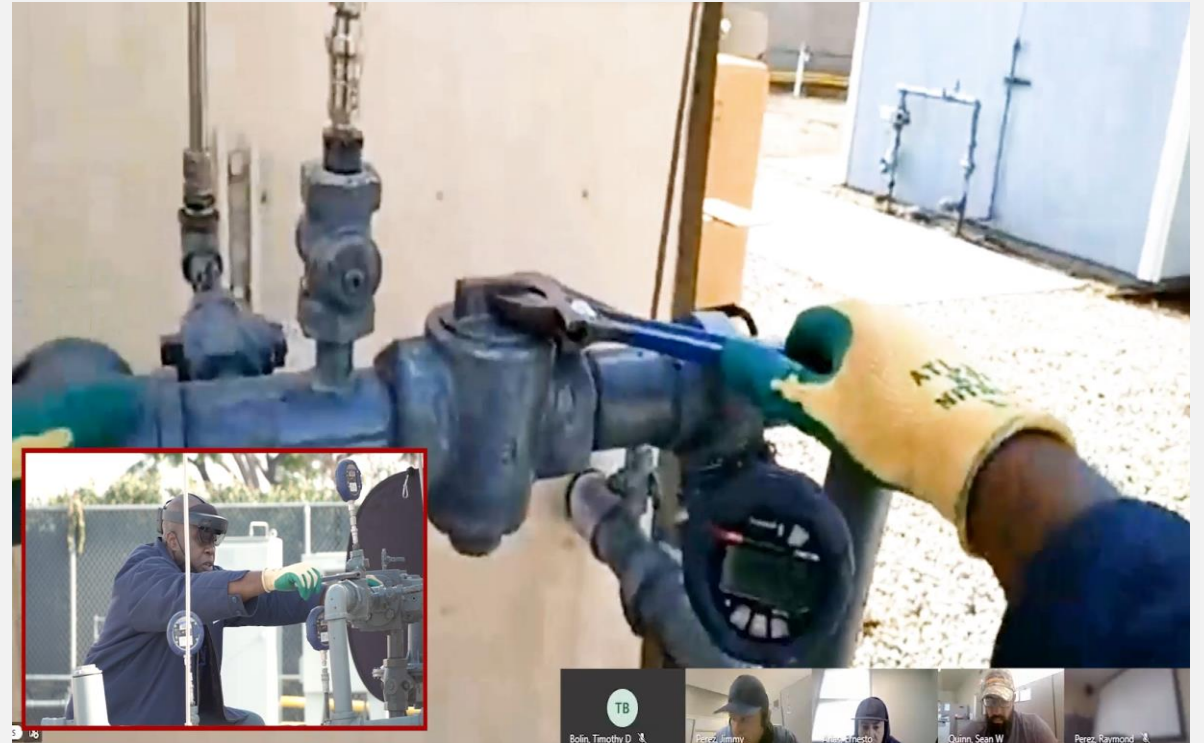


In-Person Only Classroom Training

Students had to travel and stay in hotels
Covid restrictions

HoloLens – Remote Class Teams Meetings

Students can see out of the Instructor's eyes
Instructor can walk through equipment and tasks



Objective: Reduce travel time for Requalification and 1:1 Training

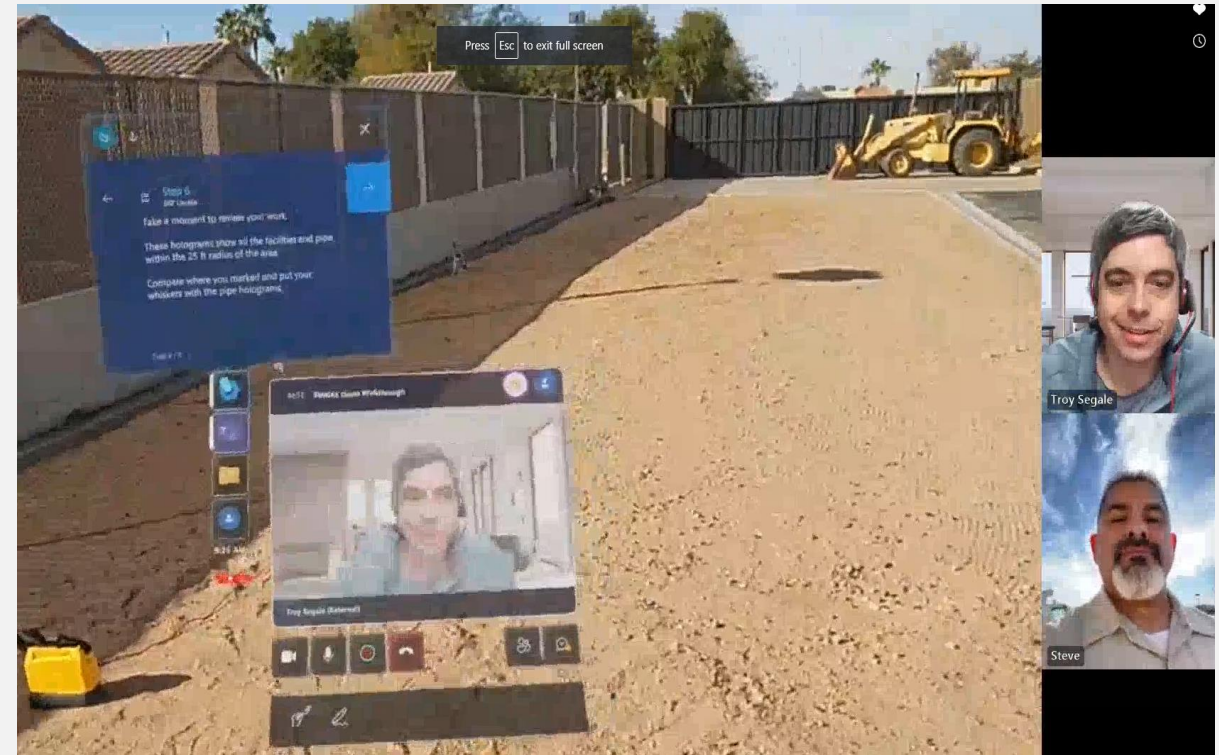
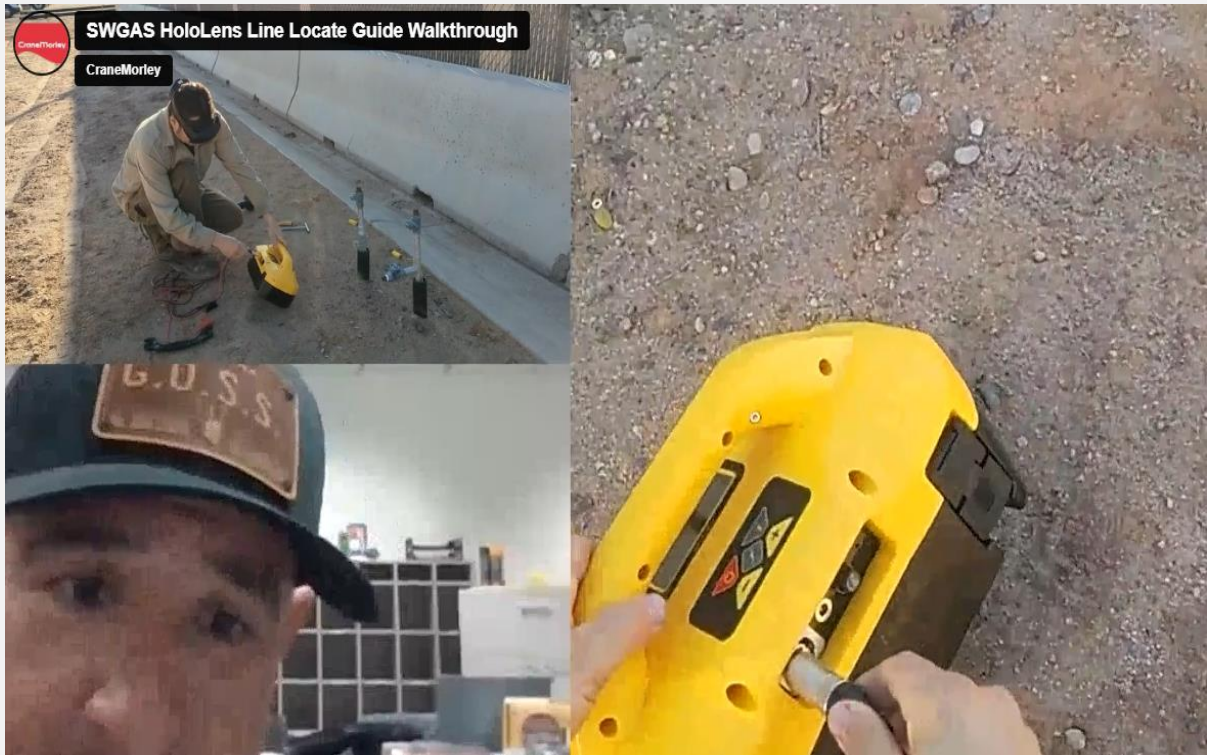


Heavy Travel

2-4 hours driving one-way to support requalification and one-to-one training

HoloLens – Remote Collaboration / Support

Instructors support and requalify workers remotely without having to travel



WHAT IS THE FUTURE FOR THIS TECHNOLOGY?

- AI Copilot
- More headset and software options



A person wearing a VR headset is shown in a dark industrial setting, possibly a factory. The person is wearing a dark jacket with a name tag that says "Max". Overlaid on the scene are several glowing blue digital graphics, including a large gear-like structure and various circular patterns, suggesting a mixed reality or augmented reality environment. The text "Mixed Reality + AI Microsoft 'Copilot'" is overlaid in a light yellow color.

Mixed Reality

+

AI

Microsoft 'Copilot'

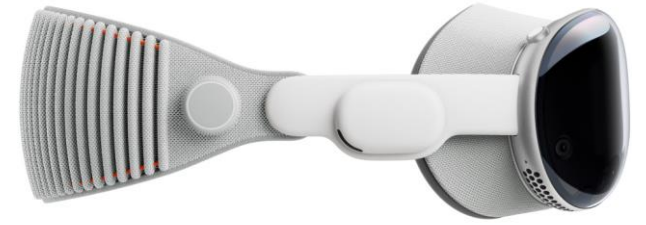
XR Headsets



Microsoft HoloLens 2



Meta Quest 3



Apple Vision Pro



RealWear Navigator Z1



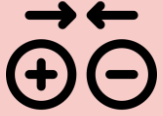
Meta Ray-Ban Smart Glasses

CHALLENGES WE FACED

- Friction adopting new technologies and changes
- WIFI in the field



Challenges



Friction adopting new technologies and changes



WiFi or Cell signal required for live remote collaboration

What Helps Moved Things Forward



An internal champion and cross-department collaboration: Training + IT, + R&D and Innovation etc.



Hotspots or new WiFi beacons



Q&A / Discussion

THANK YOU!

NGA SPRING
OPERATIONS CONFERENCE
APRIL 4, 2024

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Engagement Roadmap



Envision



Pilot



Blueprint



Develop/Train



Scale