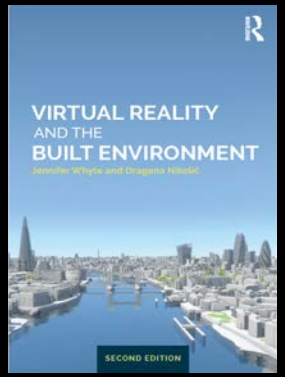
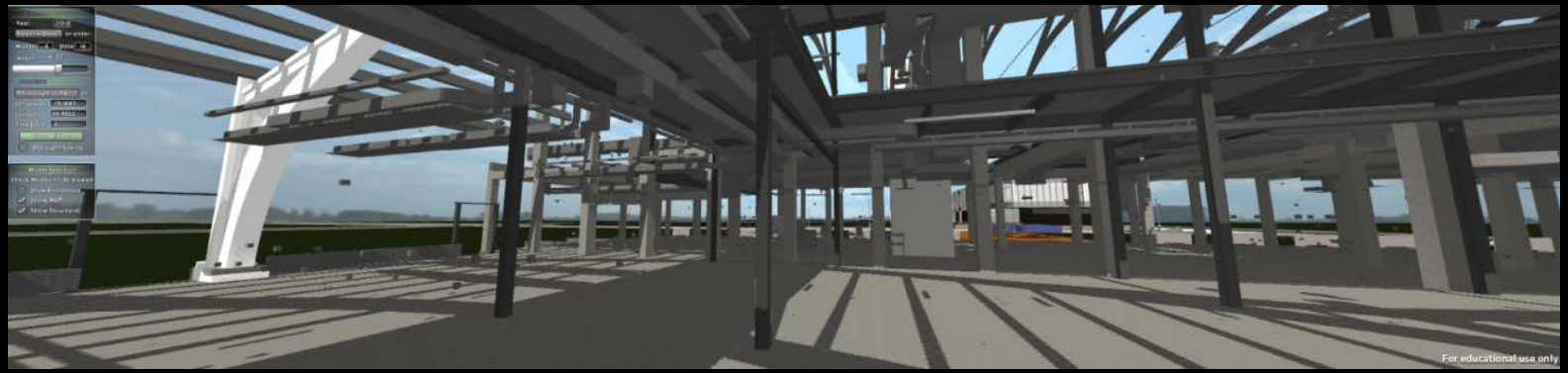
Building for better future: Innovative use of digital technologies





Dr. Dragana **NIKOLIC**

David **Throssell**

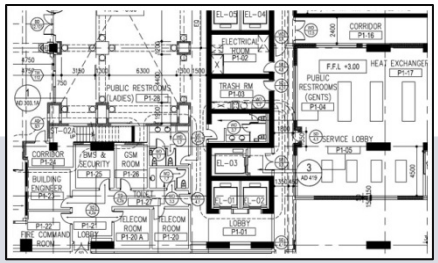
University of Reading

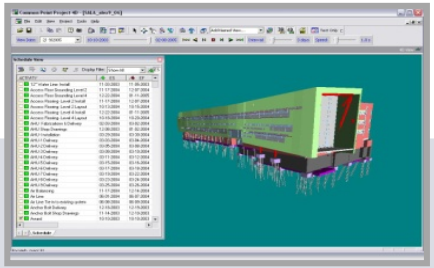
SKANSKA

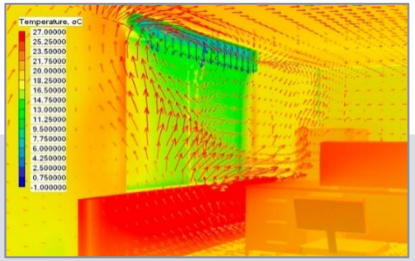
Challenge:
In theory, design and construction pre-visualization should be able to catch more problems sooner, allowing faster time to market better designs at the end.

The ability to visualize a facility design is critical for project stakeholders to collaboratively evaluate the design

Information may be our most important tool, and to know how to use it, we have to understand it first.



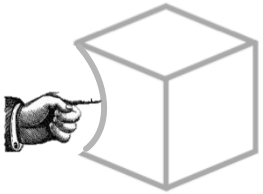




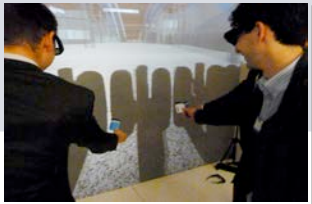
Representing information

visualization

information

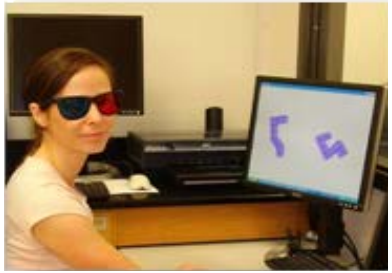


Interacting with information

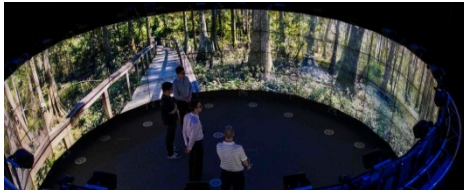


Types of VR technologies by the amount of (physical) immersion they offer:

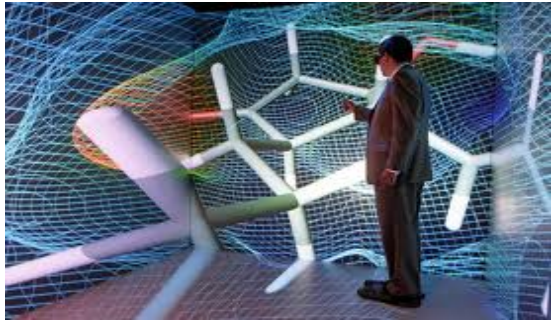
NON IMMERSIVE



www.nmr.mgh.harvard.edu



IMMERSIVE

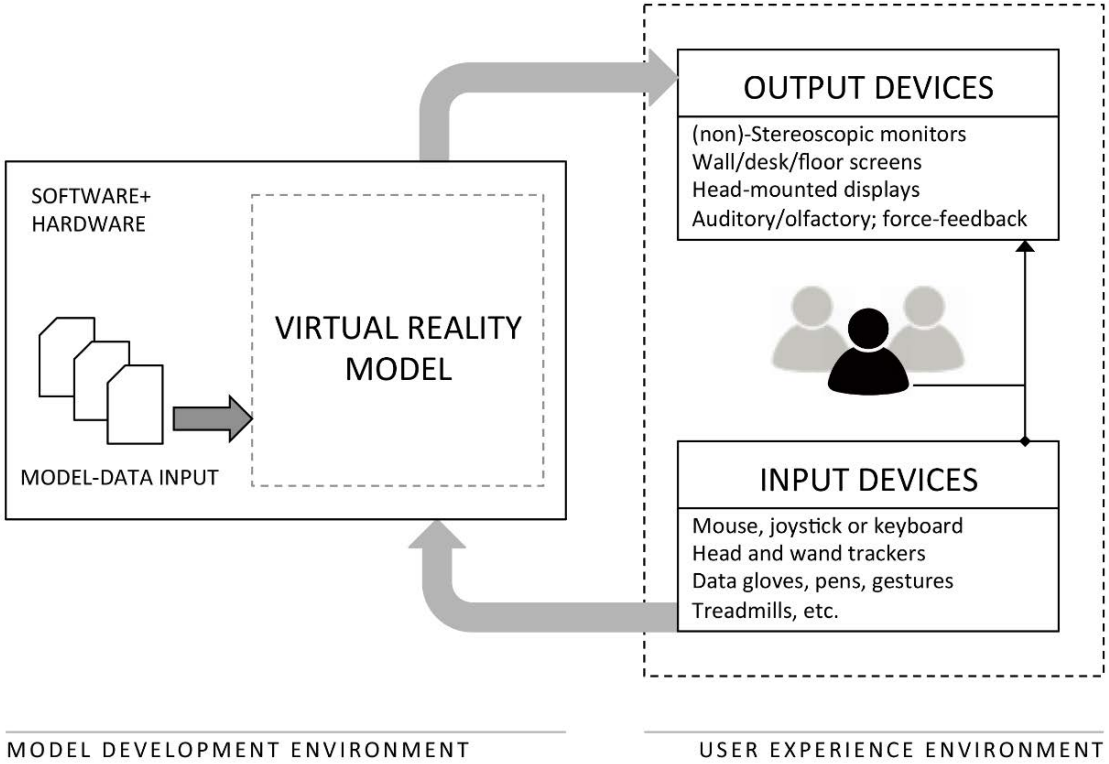


www.neatorama.com

Types of VR technologies by the user experience:

	MULTIPLE USERS	SINGLE USER
BUILT ENVIRONMENT **USERS**	DESIGN REVIEW	POKEMON GO
BUILT ENVIRONMENT **PROFESSIONALS**	CONSTRUCTABILITY REVIEW	SAFETY SIMULATION

VR involves the development of the interactive content and the considerations of the display and interaction technologies for the specified users

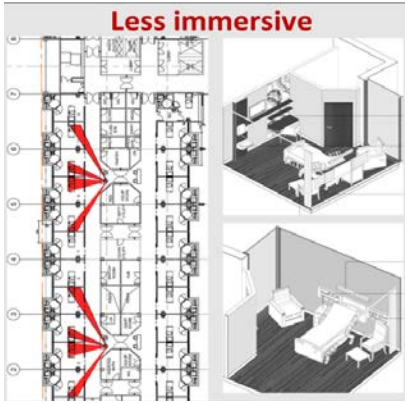


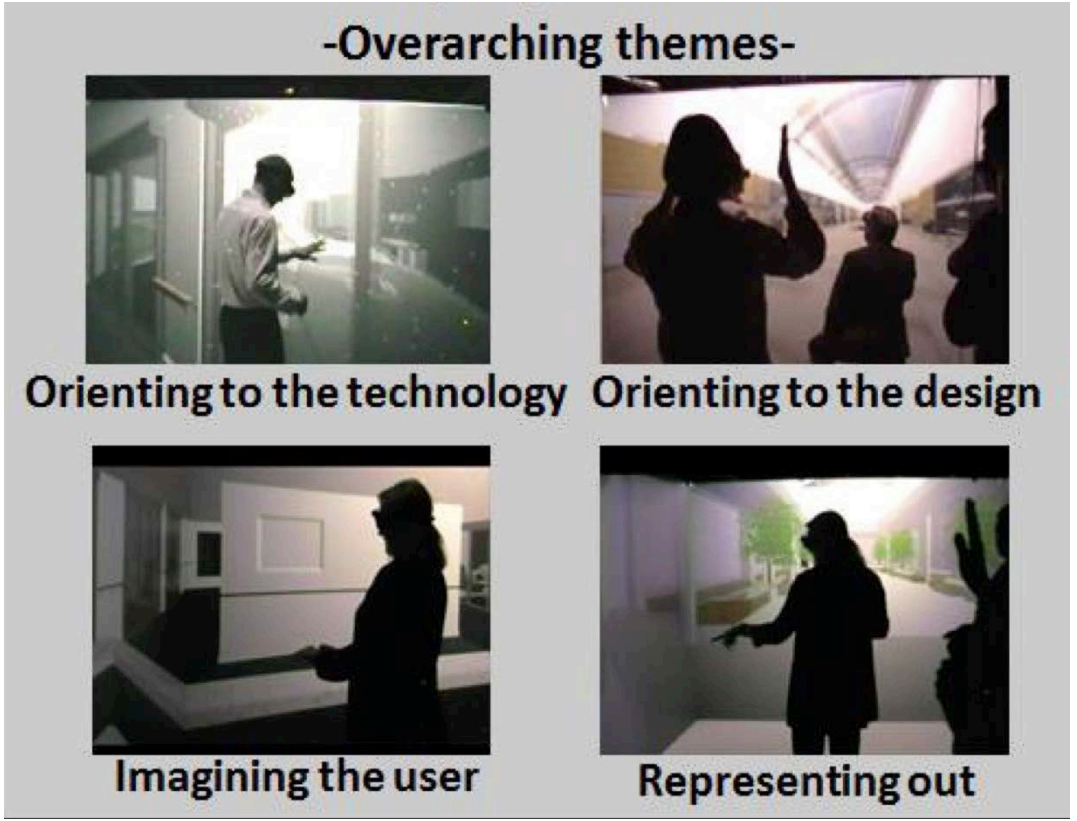
Technology as a choice (**pull**)

vs.

Technology as an infliction (**push**)

Case study: Designing in CAVEs:
Using immersive visualization in design practice





Maftei, L. and Harty, C. (2015) “Designing in Caves: Using Immersive Visualisations in Design Practice”. *International Journal of Architectural Research*: ArchNet-IJAR, 9(3), 53-75.

Case study: Designing in CAVEs:
Using immersive visualization in design practice




"If you get down, actually you can see a bit better"

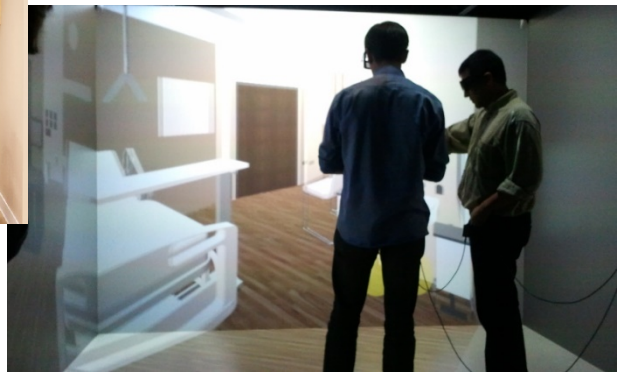
"You don't have to!"

"So if you move through, you can see what's there!"

Maftei, L. and Harty, C. (2015) "Designing in Caves: Using Immersive Visualisations in Design Practice". *International Journal of Architectural Research*: ArchNet-IJAR, 9(3), 53-75.

Case study: Papworth Hospital – Virtual Realisation of Design

- An appreciation of spatial quality
- An opportunity to "feel" the design
- An opportunity to check compliance
- To try different finishes and colours
- To check sight lines (way finding)



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Case study: Using immersive VR for quality inspection training (University of Reading and SKANSKA)

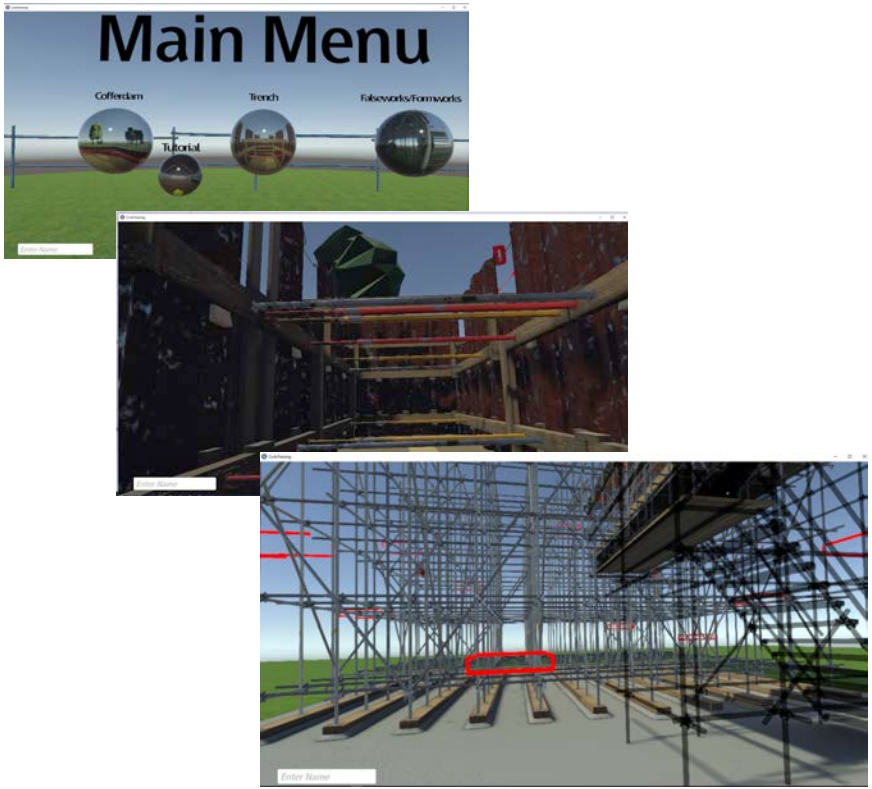

Image courtesy: Dr. Richard Davies

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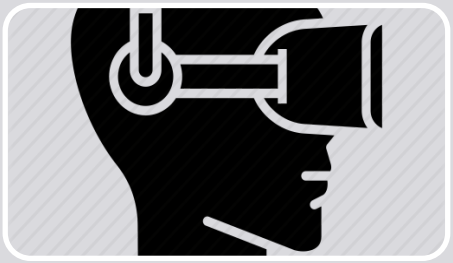
Augmented, Virtual, Mixed…What's the difference?

Augmented Reality

Digital content that is overlaid on top of the real world.

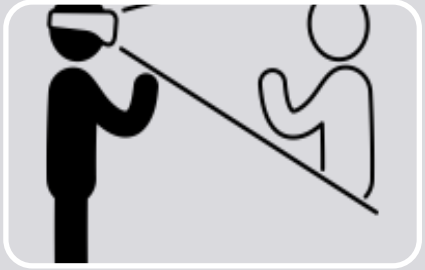
Provides workers with information about a task in a Head's Up Display (HUD) by projecting images onto lenses in front of the users eyes.



Virtual Reality

Digital environments that shut out the real world.

VR totally shuts out the real world and replaces it with a virtual one using 360-degree video, photospheres or computer-rendered environments.



Mixed Reality

Digital content that you can interact with in the real world.

Mixed reality is the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time

Skanska AR Use Cases

(1) Viewing Geospatially Accurate Data

(2) Viewing Asset Attribute Data

(3) Way Finder for Assets

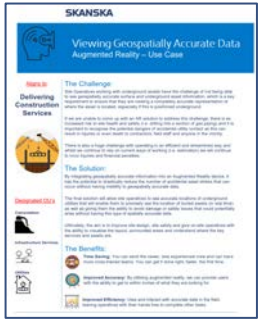
(4) Guided Working Instructions

(5) Mapping of Exclusion Zones

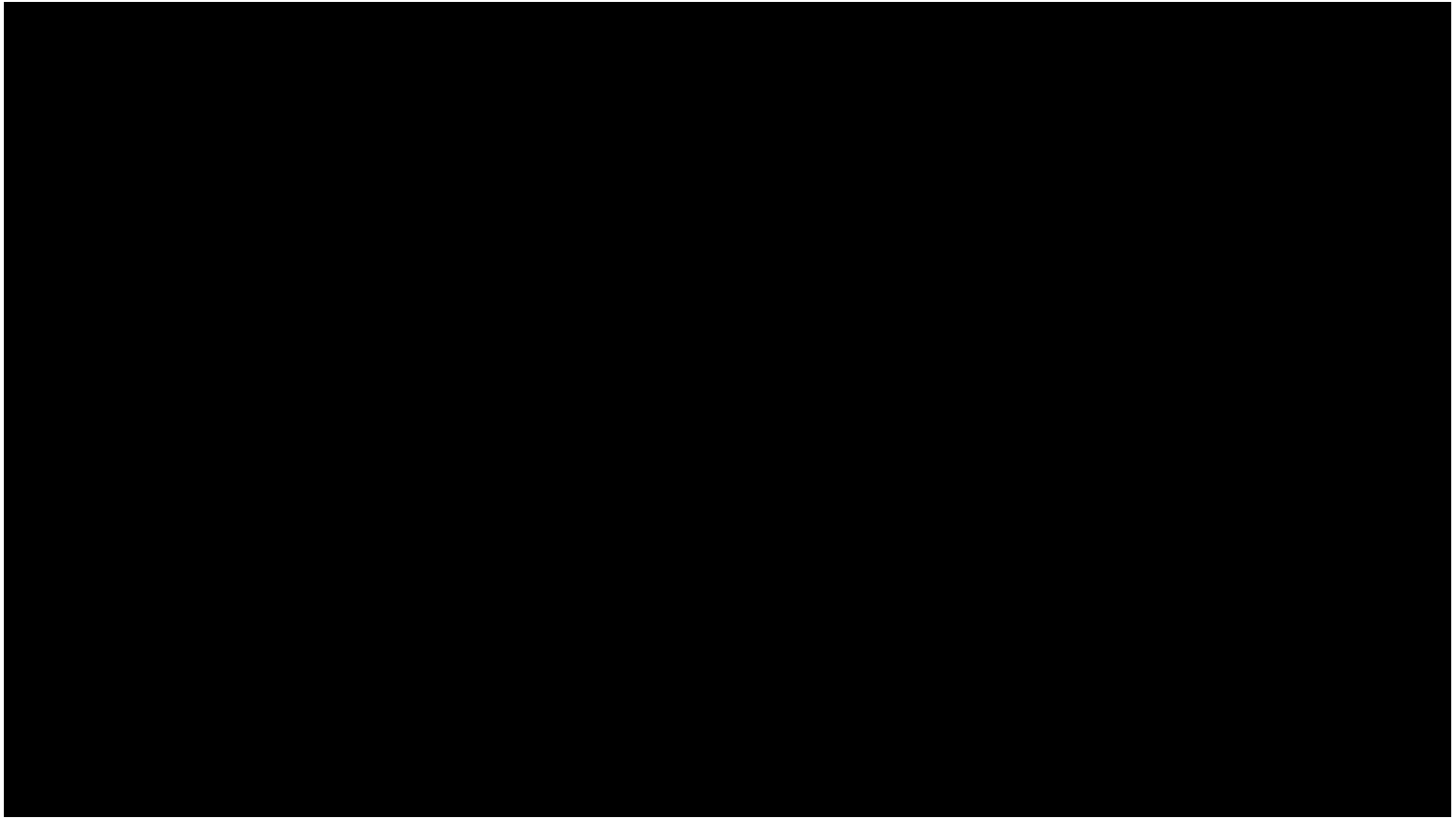
(6) Collecting Asset Attribute Data

(7) 4D Planning Analysis

(8) Remote Expert Support



AR Use Case: Viewing Asset Attribute Data



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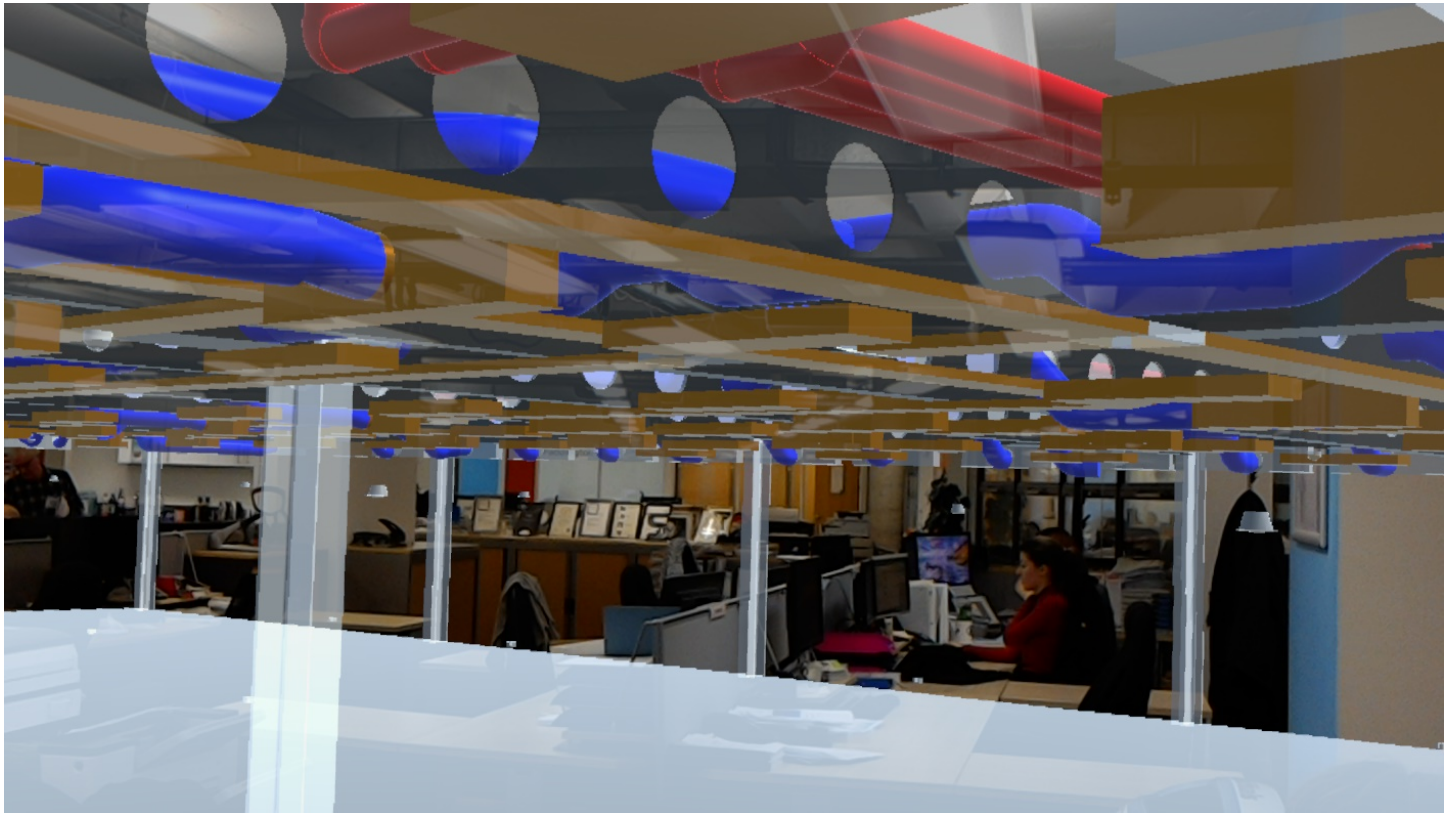
AR Use Case: Viewing Geospatially Accurate Data



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AR Use Case: Guided working instructions

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Concluding thoughts:
Why use VR? Changing experiences and challenges for VR adoption:

Engagement: Human perception especially good in seeing unexpected and unanticipated emergent properties.

No "one size fits all". No single best solution for every use scenario (needs understanding of tasks and users).

Design proofing: VR provides a rich set of spatial and depth cues and rapid interaction cycles for probing volumes of data.

Data flow: Goal: seamless and bi-directional data exchange between existing design systems and VR applications.

Savings: Simulating experiences and design scenarios when physical mockups are costly or impossible.

Change management: Top-down & bottom-up. VR adoption requires buy-in from its intended users.

Thank you.

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