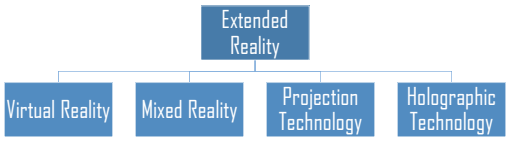
Agenda

- About Extended Reality
- IMEG's Virtual Reality Solution
- Case studies
- What's next?

ABOUT EXTENDED REALITY

Extended Reality

- An umbrella term for the technologies that add to or supplement a person's conventional reality



Extended Reality

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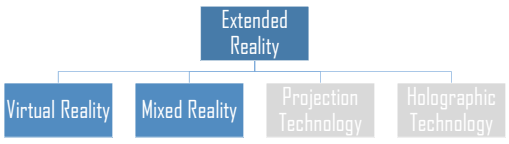
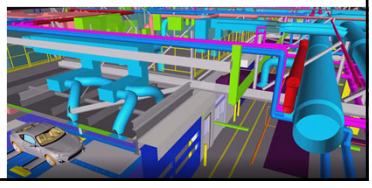


Virtual Reality

- Totally Immersive
- Transports the user to a totally different environment
- Requires hardware
  - Oculus Rift
  - HTC Vive
  - Google Cardboard



VIRTUAL REALITY IN ENGINEERING DESIGN

Virtual Reality

- **AEC Applications**
  - Stakeholder Engagement
  - Owner Buy-In
  - Internal/Team Coordination

VIRTUAL REALITY IN ENGINEERING DESIGN

Mixed Reality

- **Inclusive**
- **See current environment and add information to it**
- **Requires Hardware**
  - Microsoft Hololense
  - Tablets with a front facing camera
  - Google Glass

VIRTUAL REALITY IN ENGINEERING DESIGN

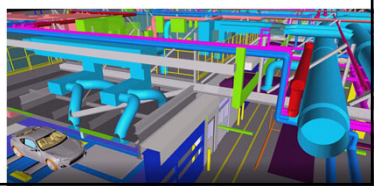
Mixed Reality

- **Inclusive**
- **See current environment and add information to it**
- **Requires Hardware**
  - Microsoft Hololense
  - Tablets with a front facing camera
  - Google Glass
  - Pokemon Go App

VIRTUAL REALITY IN ENGINEERING DESIGN

Mixed Reality

- **AEC Applications**
  - Construction Coordination
  - Internal Training
  - Stakeholder Engagement
  - Facilities Management



IMEG'S VIRTUAL REALITY SOLUTION

VIRTUAL REALITY IN ENGINEERING DESIGN

IMEG's Virtual Reality Solution

- **Oculus Rift**
  - Relatively portable
  - Bring walkthroughs to the user

VIRTUAL REALITY IN ENGINEERING DESIGN

Tools Required for Virtual Reality

- **Short Path**
  - Revit → Virtual Reality Add-In Tool (Enscape, IrisVR, Revisto, etc.)
  - Quick – what you see is what you get (for better or worse!)

- **Long Path**
  - Revit → 3Ds Max → Unity / Unreal
  - Slow – take more time to add detail and interactivity

CASE STUDIES

VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

- **Stakeholder Engagement: OR Renovation**
  - We invited doctors and nurses to review the design for a new Operating Room in Virtual Reality before it was constructed

VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

- **Stakeholder Engagement: OR Renovation**
  - Virtual Reality walkthroughs are much quicker and less costly to build than physical mockups
  - Virtual Reality walkthroughs better capture design intent for stakeholders that are not trained to read engineering plans
  - Virtual Reality walkthroughs can be completed multiple times through the life of the project

VIRTUAL REALITY IN ENGINEERING DESIGN

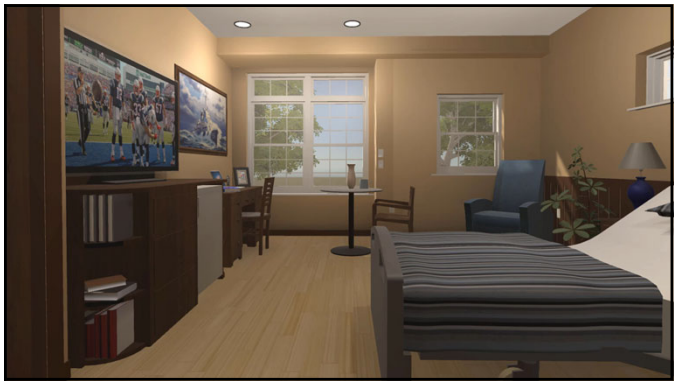
Case Studies

- **Stakeholder Engagement: OR Renovation**
  - Your equipment solution matters (RAM and graphics cards!)
  - Jittery walkthroughs make people ill ☹
  - Poor lighting and shading can pull people out of the experience

VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

- **Owner Buy-In: New Long Term Care Facility**
  - We invited the owner to review the design before it was constructed



VIRTUAL REALITY IN ENGINEERING DESIGN

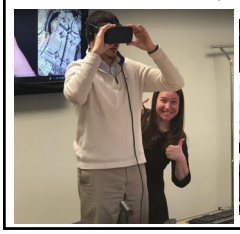
Case Studies

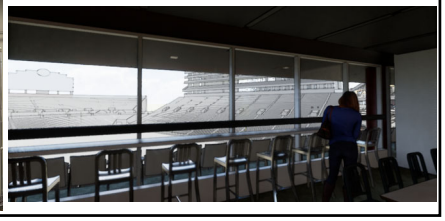
- **Owner Buy-In: New Long Term Care Facility**
  - Details and materials matter – and you can get stuck on them
  - Have specific talking points to drive the conversation
  - Lock down areas that you do not want to people to enter

VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

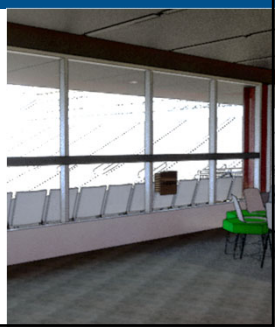
- **Internal Coordination: A New College Arena**
  - Where we put an IMEG engineer into a VR headset for the first time on a project that had a deliverable the next day





VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies



VIRTUAL REALITY IN ENGINEERING DESIGN

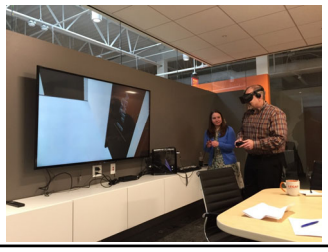
Case Studies

- **Internal Coordination: A New College Arena**
  - Engineers notice things that they might not catch in Revit
  - Engineers notice things that might not report as a clash

VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

- **Team Coordination: Team Project Design Meetings**
  - Where we take the entire AEC team and review the project in VR



VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

- **Team Coordination: Team Project Design Meetings**
  - We focus on small elements that we notice in reality but not always on plans that make the project better
  - It's all about seeing the details that matter to the users of the space over the life of the facility
  - We had fun doing it

SHINY PRESENTATIONS

Seed Processing Plant Video for Owner Review

VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

- **Shiny Presentations**
  - QR Codes

New Gymnasium

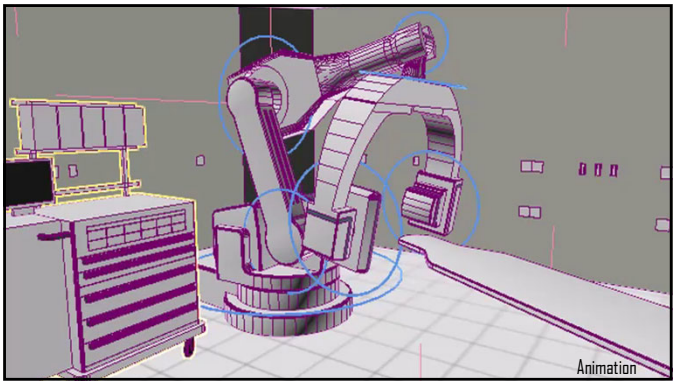
New Mechanical Room

VIRTUAL REALITY IN ENGINEERING DESIGN

Case Studies

- **Overall Lessons Learned**
  - All members of the design can benefit from Virtual Reality
    - Stakeholders, Owners, Designers
  - Virtual Reality should be used for what it's good at
    - Immersive visualization
    - Details and Materials Matter
    - You get out what you put into it
  - Backup your backups
    - When doing live demos, prepare for the absolute worst: extra batteries, failed exe files, no wi-fi to log into, sweaty people touching your equipment, people getting dizzy
  - The technology is changing constantly
    - It's work to keep up with it. Find someone who is passionate about it and let them become a subject matter expert

WHAT'S NEXT?

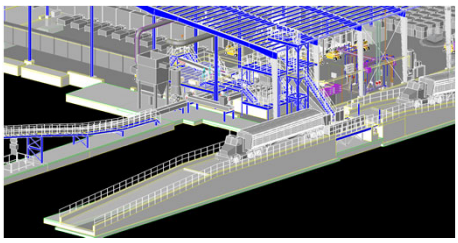


Animation

VIRTUAL REALITY IN ENGINEERING DESIGN

What's Next?

- **Acoustical Analysis**
  - Sound in the facility – now + potential



VIRTUAL REALITY IN ENGINEERING DESIGN

What's Next?

- **Mixed Reality**
  - Visualize existing utilities below grade
  - Demonstrate new equipment in existing spaces
  - Internal Training Applications


IMEG