One Firm’s Journey to Blend BIM and Virtual Reality
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• BIM Manager at KJWW Engineering
• Started out working for an architect
• Revit since 2007
Virtual Reality is the new 3D

THE VIRTUAL REALITY TREND
Head Mounted Displays
Augmented Reality
Augmented Reality
Virtual Reality
A Brief History of Virtual Reality

- Stereoscope
- Flight Simulation
- Military Training
- Movies
- Early Consumer Models
- Early Commercial Models
VR Applications - Entertainment
Applications - Amusement

https://www.youtube.com/watch?v=qMkg5p905Sc
Applications - Training
Applications - Training
The Current Leader

OCULUS RIFT
Oculus Rift
Oculus Rift
Oculus Rift

Lens

Screen
Immersive BIM

BIM + VR
BIM
BRIEF DEMONSTRATION

BIM → VR
Assemble your Tools

• Software
  – Revit
  – 3Ds Max
  – Unity
  – Oculus SDK

• Hardware
  – Oculus Rift headset
  – Computer

• Patience
From BIM to VR

• Start with a clean Revit Model
• Export to FBX
• Import FBX into 3Ds Max
• Export FBX from 3Ds Max
• Add FBX as asset in Unity
• Add camera, lighting, materials
• Build
Clean Revit Model

- Eliminate unnecessary geometry
- Consolidate materials
- Eliminate warnings
- Eliminate topography
- Create a 3D view
- Export to FBX
Export Revit to FBX
Import FBX into 3Ds Max

- **Import**: Import non-native file formats into 3ds Max.
- **Merge**: Insert objects from external 3ds Max files into the current scene.
- **Replace**: Replace objects in the current 3ds Max scene with objects from an external file.
- **Link Revit**: Insert a link to a RVT or FEX file into the current scene.
- **Link FBX**: Insert a link to a FBX file into the current scene.
- **Link AutoCAD**: Insert a link to a DWG or DXF file into the current scene.

Options | Exit 3ds Max
Import FBX into 3Ds Max
Import FBX into 3Ds Max
Export FBX from 3Ds Max
Download Unity and the SDK

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<th>Platform</th>
<th>Date Added</th>
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Add Unity Assets and Objects

• Import Assets
• Create a plane
• Create a light
• Apply materials
• Add camera
Build Settings

Scenes In Build
- cath lab.unity

Platform
- Web Player
- PC, Mac & Linux Standalone
- iOS
- Android
- BlackBerry
- Windows Store
- Windows Phone 8

Target Platform
- Windows
- Mac
- Linux

Architecture
- x86

Development Build
- Autoconnect Profiler
- Script Debugging

Add Current

Build Settings for PC, Mac & Linux Standalone

Resolution and Presentation
- Default Is Full Screen
- Default Screen Width: 1920
- Default Screen Height: 1080
- Run In Background

Standalone Player Options
- Capture Single Screen
- Display Resolution Dialog
- Use Player Log
- Resizable Window
- Mac App Store Validation
- Mac Fullscreen Mode: FullscreenWint
- D3D9 Fullscreen Mode: FullscreenWint
- D3D11 Force Exclusive Mode
- Visible In Background
- Force Single Instance

Supported Aspect Ratios
- 4:3
- 5:4
- 16:10
- 16:9
- Others

* Shared setting between multiple platforms.
Plug in your Oculus, test your Build
Tips

• Be patient.
• Take notes, replicate.
• Don’t try to light up your fixtures
• Remove door panels in Revit
• Add materials and detail to the Revit model
• Tighten your headset straps
• Update your firmware
  – Oculus Configuration Utility → Tools → Advanced → Update Firmware
The Possibilities are Endless

APPLICATIONS
Applications

- Client Engagement
- Coordination/Clash Detection
- Training
- Team Building
Barriers to VR

- Rendering Quality
- Motion Blur
- Delayed Tracking
- Field of View
- Limited interaction
Recommended Further Learning

• Get Unity 5: [http://unity3d.com/5](http://unity3d.com/5)
• [https://developer.oculus.com/documentation](https://developer.oculus.com/documentation)
  – Unity Integration Guide
  – User Guide
• Unity Support Documents
• Penn State Revit to Unity
Upcoming Virtual Reality Topics

- Autodesk Material Converter (paid plugin)
- Oculus Crescent Bay Model
- Samsung Gear VR Headset
- Google Cardboard
- HTC Vive VR Headset
- Leap Motion
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Questions?