Real-Time Visualization and Simulation with 3ds Max and Bitsquid

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VI7267

Discover how real-time game engine technology can help you to develop rapid workflows for real-time visualization, enabling you to iterate your designs more swiftly and efficiently. In this class you will learn how to use Autodesk, Inc.'s, BitSquid real-time engine to interactively explore and communicate your design intent. Your experience will be far more compelling and understandable when you use a real-time engine to switch between variations of interior designs, or when you use it to experience the build-up process of a bridge, an oil rig, or a hotel. In this class you'll learn how to set up your construction data inside of 3ds Max software in order to create a data set that can be explored and lit directly in the game engine. To underline the power of using BitSquid engine for real-time visualization, we will use a data set to simulate evacuation procedures in case of catastrophic events such as fire or explosion.

Learning Objectives

At the end of this class, you will be able to:

- Understand the benefits of using a game engine for visualization

- Learn how to optimize CAD data in 3ds Max software for real-time visualization

- Learn how to import data and set up navigation input peripherals into the BitSquid game engine

- Learn how to use particle effects and real-time lighting to enhance your story

About the Speaker

Alex Horst's extensive experience with 3ds Max software dates all the way back to his high school years, when he gave his first demo of 3D Studio R3 software in 1993. Since then Alex has worked with a large number of customers, mainly in the games and design visualization industry. Today Alex focuses on the optimal use of the 3ds Max Entertainment Creation Suite products. He helps companies to optimize creative processes and get what they need out the Autodesk, Inc., products.

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3ds Max to Engine optimization

Things to check after CAD data import into 3ds Max

- **Correct Scale.** (Many engines – such as Bitsquid are working in metrics / meters. Bitsquid will convert whatever units you are using upon export / import. But you'll want to make sure the scale in 3ds Max is not totally off, which can easily happen depending on where the CAD data came from)

- **Object Count:**
    - o Use the data > summarize in 3ds Max to check for potential issues such as too high poly and Object Count.
    - o DirectX based 3d engines will dramatically slow down when using thousands and thousands of single objects.
        - ▪ Workarounds are:
            - Object Groups
            - Collapsing multiple objects into single ones
            - Instancing (there is a Instancer script on Scriptspot.com which will re-create instances based on identical geometry: http://www.scriptspot.com/3ds-max/scripts/instancer-0
            - Use the engine itself to build-up the geometry.
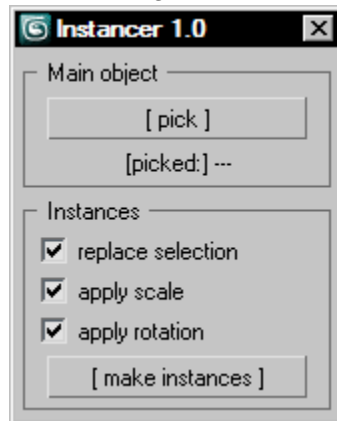
- **Check objects for open edges, overlapping faces, overlapping vertices**
    o Viewport > xView
    o Open edges can cause issues when trying to apply UV coordinates or animations
    o To fix:
        ▪ Select object
        ▪ Make sure it is an editable poly (rightclick > convert to > editable poly)
        ▪ Go into Vertex subobject mode
        ▪ Select all vertices (CTRL + A)
        ▪ Open Weld [Settings]
        ▪ Change the value to 0
        ▪ Click the up arrow for the value one time – which will set the value to something like 0.0001
        ▪ This should weld Vertices that are on the exact same position and maintain you overall geometry.
        ▪ Cross-check:
            • Switch to Element Mode
            • Select one element and move
            • Shouldn't drag any sole faces along
        ▪ Finally you can re-adjust the smoothing group by adding a "Smooth" modifier and an angle (normally something between 30 and 45 degrees)
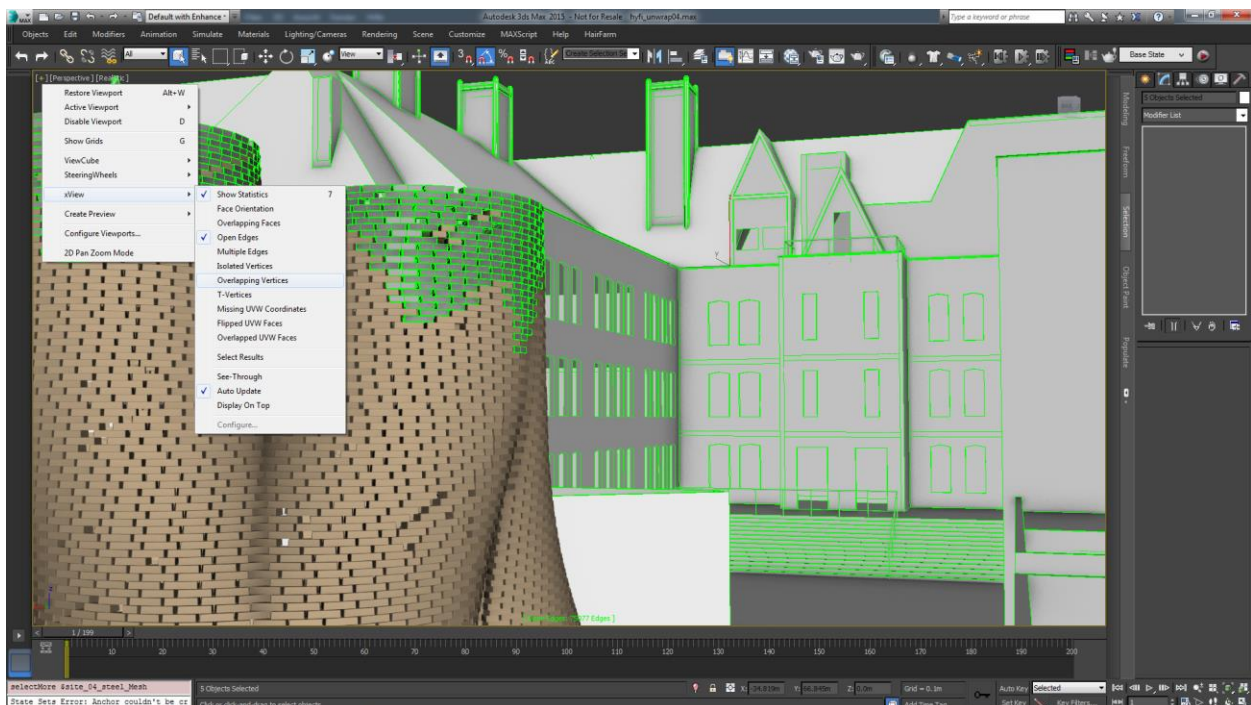
- **Check for normal direction**
- Polygons have one face direction (face normal) along which they will be "seen" by the renderer. By default 3ds Max displays polygons as double-sided (Backface Cull disabled). The game engine later on won't display geometry as double-sided. It can: but it will use twice the polygon count to do so.
- Therefore fixing or unifying face normal direction can be important.
- To visualize check for potential issues you can:
    - Select (all) objects
    - Rightclick > object properties > enable Backface Cull
    - Single faces can be selected and flipped via Edit Poly or Edit Mesh
    - Alternatively you can add a Edit Normals modifier, which is going to display face normal for you and gives you access to edit these.
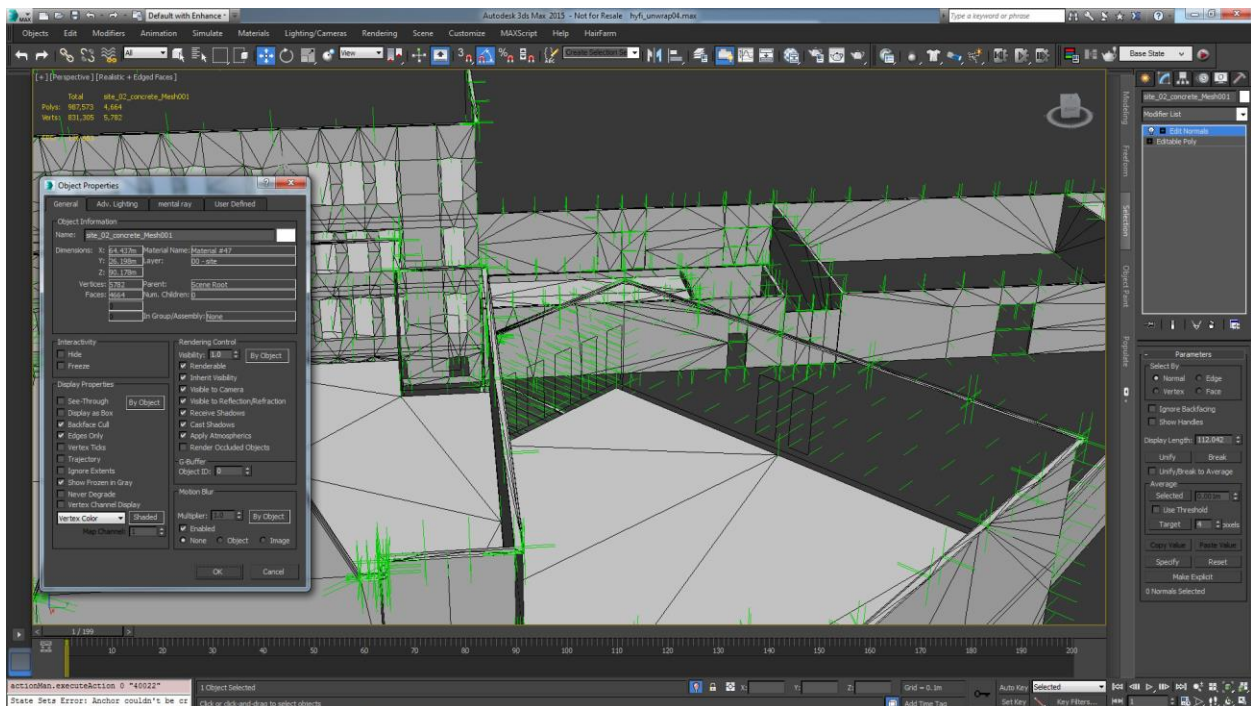
Textures

- Use square textures (especially important for iOS optimization)

- Resolution for real-time engines is always power of two (8x8; 16x16; 32x32; 64x64; 128x128; 256x256; 512x512; 1024x1024; 2048x2048; 4096x4096)

- DirectX native texture format: dds.
    - File formats like png / bmp / jpg / tga etc. will get converted to gpu-format at runtime utilizing CPU power and taking up loading-time.
    - Many engines will internally automatically convert your textures to DDS.
    - You can create DDS textures easily by downloading the NVIDIA Photoshop Plugin from:
    https://developer.nvidia.com/nvidia-texture-tools-adobe-photoshop
    Or by using the Microsoft DirectX SDK

- There are different DDS compression formats that will reduce texture size memory usage for GPU.
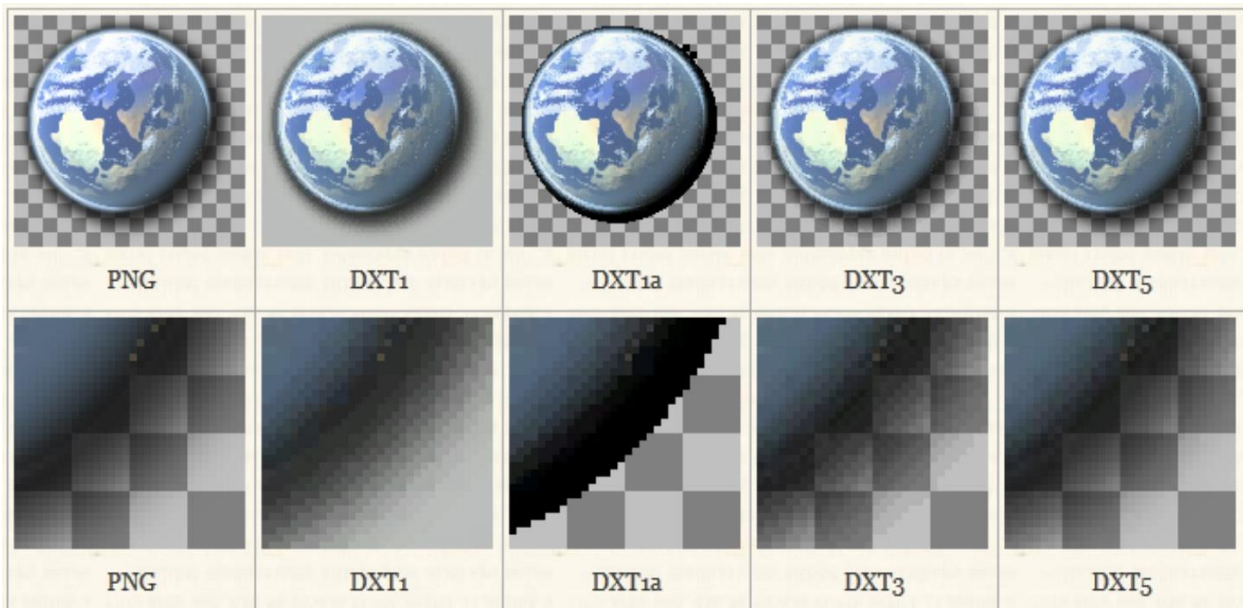
UVW Mapping

- UV Unwrap in 3ds Max to generate unique texture coordinates per polygon.
- Reusing the same texture space for different faces can save on texture memory and improve overall display quality.
- There are a number of 3ds Max plugins that will greatly improve your UV Packing / Unwrapping experience inside of 3ds Max.

- For more info go to: http://www.3d-plugin.com/

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Additional information:

Sign up for further Bitsquid News: www.autodesk.com/bitsquid

Bitsquid Homepage: http://bitsquid.se/

Autodesk youtube Channel: www.youtube/autodesk

Autodesk Gameware: http://gameware.autodesk.com

**Full video recording will be made available after class.
www.autodeskuniversity.com**