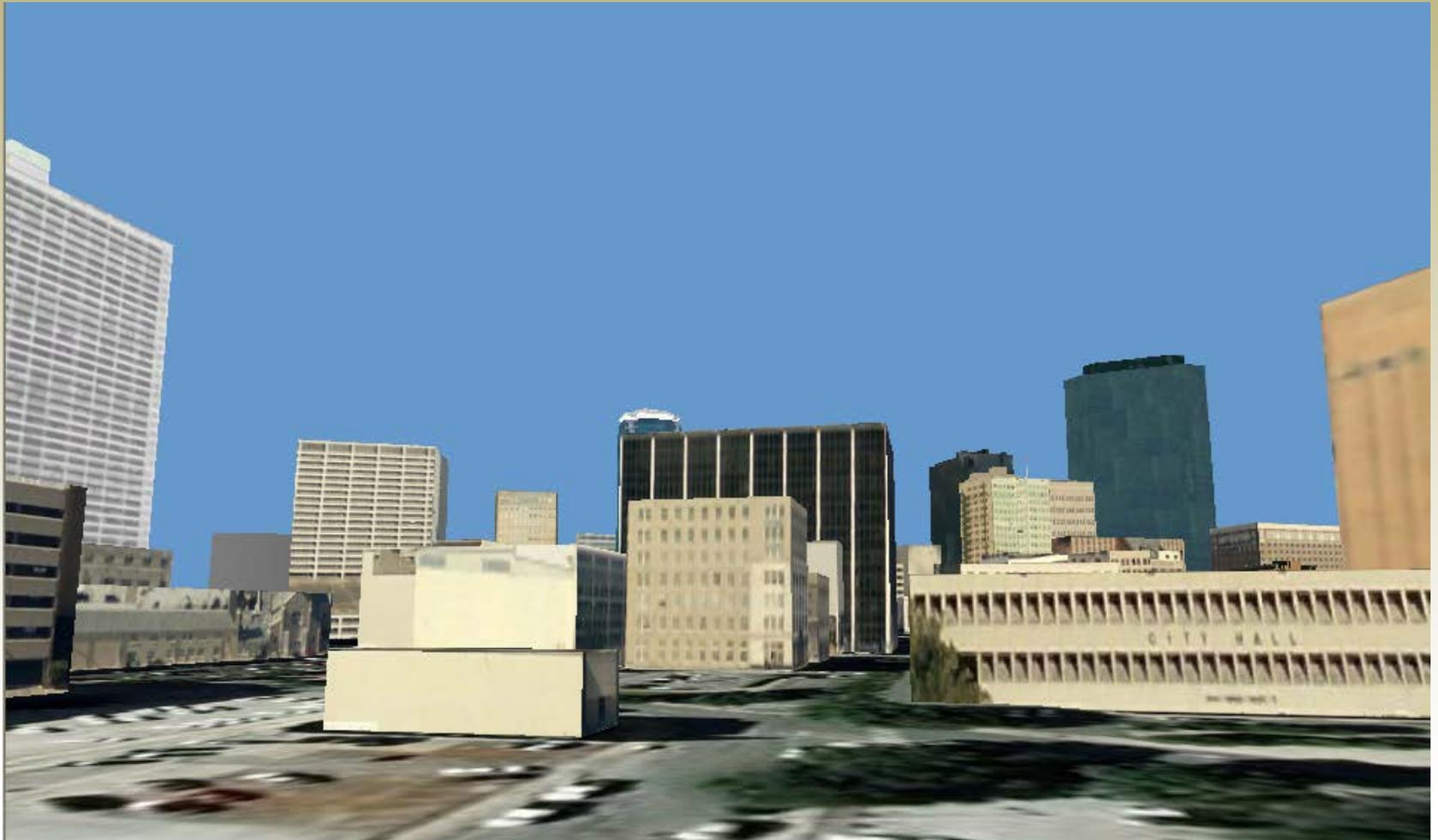


3D Modeling Downtown Buildings

NCTCOG Regional Meeting 05/08/2013



3D Modeling Downtown Buildings

- Purpose of Project:
 - Practically all of the city's GIS is performed in two dimensions.
 - This project was initiated to investigate enhancing existing EOC/GIS tools by integrating 3d building models. This would be tested with the implosion of the Medical Plaza building late July 2012.



- At the same time some departments in the city also expressed an interest in modeling downtown buildings for their own specific purposes.



3D Modeling Downtown Buildings

- Initial investigation:
 - Google Sketchup was chosen as the modeling engine because it offered an established 3d model creating platform, users from all over the world contribute to the 3d warehouse, quick user learning curve, extensive help available online, and it was free.
 - There were two options of GIS platforms ArcScene and ArcGlobe. ArcGlobe was chosen because it performed better initially and integrated better with sketchup. ArcScene would be the better choice for more advanced GIS analysis.
 - The existing building footprint feature class in GIS was used for the buildings.

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- Process:
 - The decision was made to use buildings in the immediate downtown area whose height was over 25' extracted from the existing CFW building footprint feature class. 400+ buildings were selected.



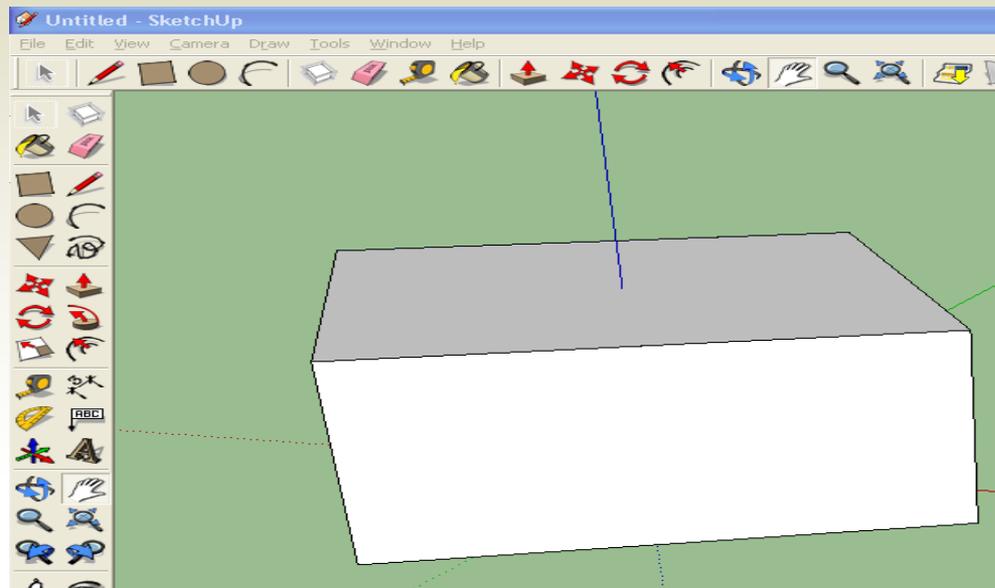
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- Process (con't)
 - The selected buildings have to be converted to a format that takes into account their vertical position as well as 3d dimensions. This format is called multipatch and once created acts like GIS feature classes.
 - Once the multipatch was created it is imported to ArcGlobe and placed on a surface and the aerial photography is turned on.



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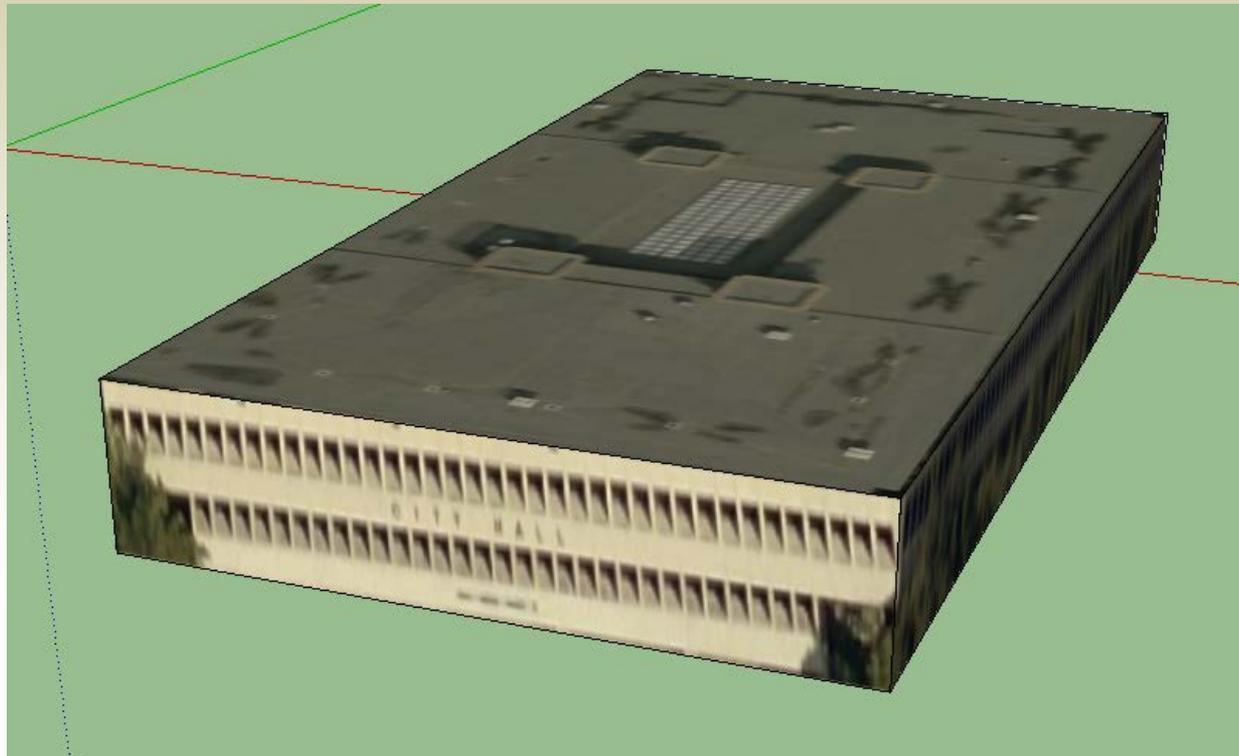
- Process (con't):
 - The buildings now have 3d components but need images on their faces to make them more realistic.
 - The user now has a choice to use an existing building or create their own in Sketchup. Sketchup is also used to attach the image to each face.





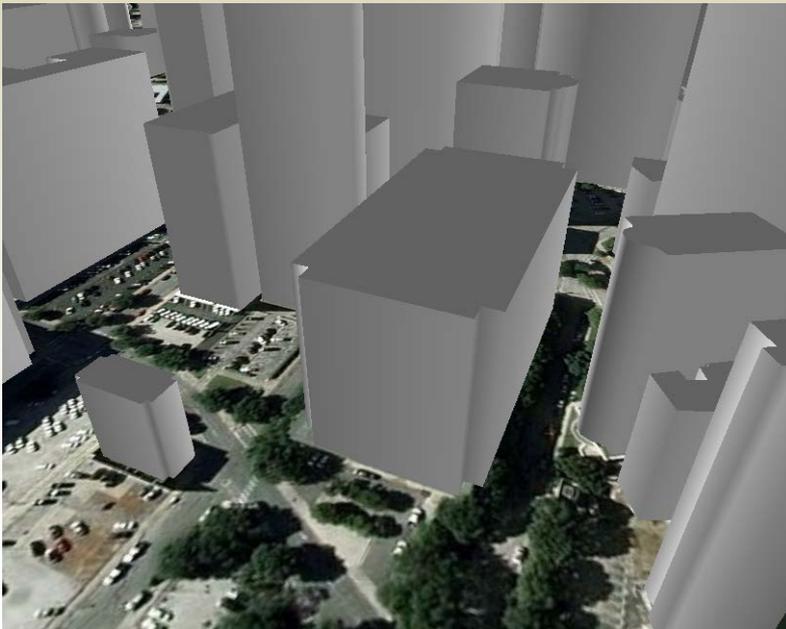
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- Process (con't):
 - The primary source for images in this project is the city's Pictometry which gives 360 deg. view and top views. Once the images are copied from Pictometry they are placed on the model in Sketchup.



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- Process (con't):
 - The model now has to be converted to a previous version of Sketchup then converted to a format called collada for use in Arcglobe. After importing the building is adjusted to fit, note, the vertically exaggerated scale is corrected.



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- Process (con't):
 - By using Sketchup and having access to Google's 3D warehouse more complex models can be imported to our feature class such as the Omni and the Convention Center. Fourteen models were used from Google.





3D Modeling Downtown Buildings

- Issues and concerns:
 - In the latest version of ArcGIS (10) direct integration of Sketchup was not retained. A new integration process had to be developed.
 - Initially the buildings would not scale correctly resulting in an exaggerated vertical and too small building model.
 - Coordinate systems between Google and ArcGIS had to be matched.
 - Because of the skew of the city streets from north and south a number of images from Pictometry did not match well to building faces. The solution would be to take our own pictures of problem areas.
 - Visibility around tall buildings also increased the need for us to take our own pictures.



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- Project Results:
 - There are two new documented processes to create, modify, and enhance existing or proposed 3d buildings in the building feature class.
 - This feature class is available on the city's production GIS server for all GIS users to use.
 - Edit permission can be granted to those who want to add more building models or maintain what is existing.



3D Modeling Downtown Buildings

- Where we go from here:
 - Planning has an interest in showing the history of downtown development as well as showing how proposed buildings will appear in the skyline for future development. This process gives a greatly enhanced visual impact.
 - This makes line of sight analysis for example microwave tower location, much easier and with greater visual impact.
 - All GIS users can add missing downtown 3d buildings or create new models for their project area.
 - Add better images to buildings needing improvement.
 - Present project to users and any department interested.
- The only true limits of this is the users imagination or need.