Visualizing the Future of NASA
Langley Research Center

Jonathan Flynn
NASA Langley Research Center
About Langley Research Center

• Located in Hampton, VA, adjacent to Langley Air Force Base

• First construction began in 1920, as part of the former NACA (National Advisory Committee for Aeronautics)

• Facilities include wind tunnels, airplane hangars, and research laboratories

• Most facilities built during the 1950s and 1960s, and are aging
The New Town Development Project

The New Town project is a multi-phase initiative to upgrade and update existing NASA LaRC facilities, demolish outdated and redundant buildings, and construct new modern facilities. In addition to this, plans to make the core area a more pedestrian pleasing environment have been made.

Most of the project is still in the planning and proposal stages, however, it was determined that a visualization was needed to help promote the project and acquire funding from NASA Headquarters.
Project Purpose

The goals of this project are to:

• Produce a 3D model of Langley Research Center
• Implement New Town proposals into the model
• Using the model, produce visualizations of the New Town plan
• Visualizations would include still imagery and rendered videos
• These visualizations are the project “deliverables”, the end product needed by Langley to secure funding for New Town
ArcMap Preparation Work

• ArcMap data of the research center is gathered

• Map data is used as a base for creation of the model as it currently exists

• Map data can also be used as a base for individual building models
Individual Building Production

The next step is to create the individual building models that will be combined into the final 3D model for visualization production

• Digital floor plans of each build are acquired

• Field work is done to acquire photography for building reference and textures
Individual Building Production

- Building is modeled in Google SketchUp
- Building textures made from photography using Paintshop Pro
- Textures then applied to buildings in SketchUp
Individual Building Production

• Fully textured building checked for errors
• Finished building model then inserted into overall model to be correctly located
• Overall model exported as a .3DS file format
Parking Lots, Sidewalks, and Fountains

- The conceptual designs for the core area are first put into ArcMap using the plans received.
Parking Lots, Sidewalks, and Fountains

• Once the designs are put into ArcMap, then they can be exported into SketchUp to provide a 2D template.

• A clip was taken to keep from maintaining the whole center.
Parking Lots, Sidewalks, and Fountains

- All layers from the New Town clip in ArcMap are exported as .dwg files.
- They can then be imported into Google SketchUp and scaled.
- In SketchUp, the 2D layout of the core area can easily be made into 3D including fountains, benches, and landscaping.
3D Model Assembly

- Import:
  - real property data from ArcMap
  - building and landscaping models from SketchUp
  - aerial photography from ArcMap
  - all other 3D and 2D data to be used
Creating the Visual

Once everything is in the model it’s time to start setting up the scene for production.

- Add light sources to help define edges with shadows
- Create camera for animation
  - Use Auto Key tool to create smooth flight patterns
- Setup render configuration and file output
Visual Output

3D studio outputs in several different still image and video formats, at almost any resolution

Screenshot before adding 3D sidewalks, fountains, and parking lots

Screenshot after
Video Output
Problems Encountered

- Problems with Google SketchUp using all the CPU usage especially the newest version of SketchUp Pro 6
- Limitations of file size in SketchUp
- Some materials for fountains are lost when exported from SketchUp
- Using networked computers can cause programs to run slow
- Long rendering times
Thank you for your time.

I will now take any questions or comments you may have.

To view 3D models go to:

http://sketchup.google.com/3dwarehouse/

Search using keywords “NASA Langley”