

Creating a Dynamic Stereographical Programming Demonstration

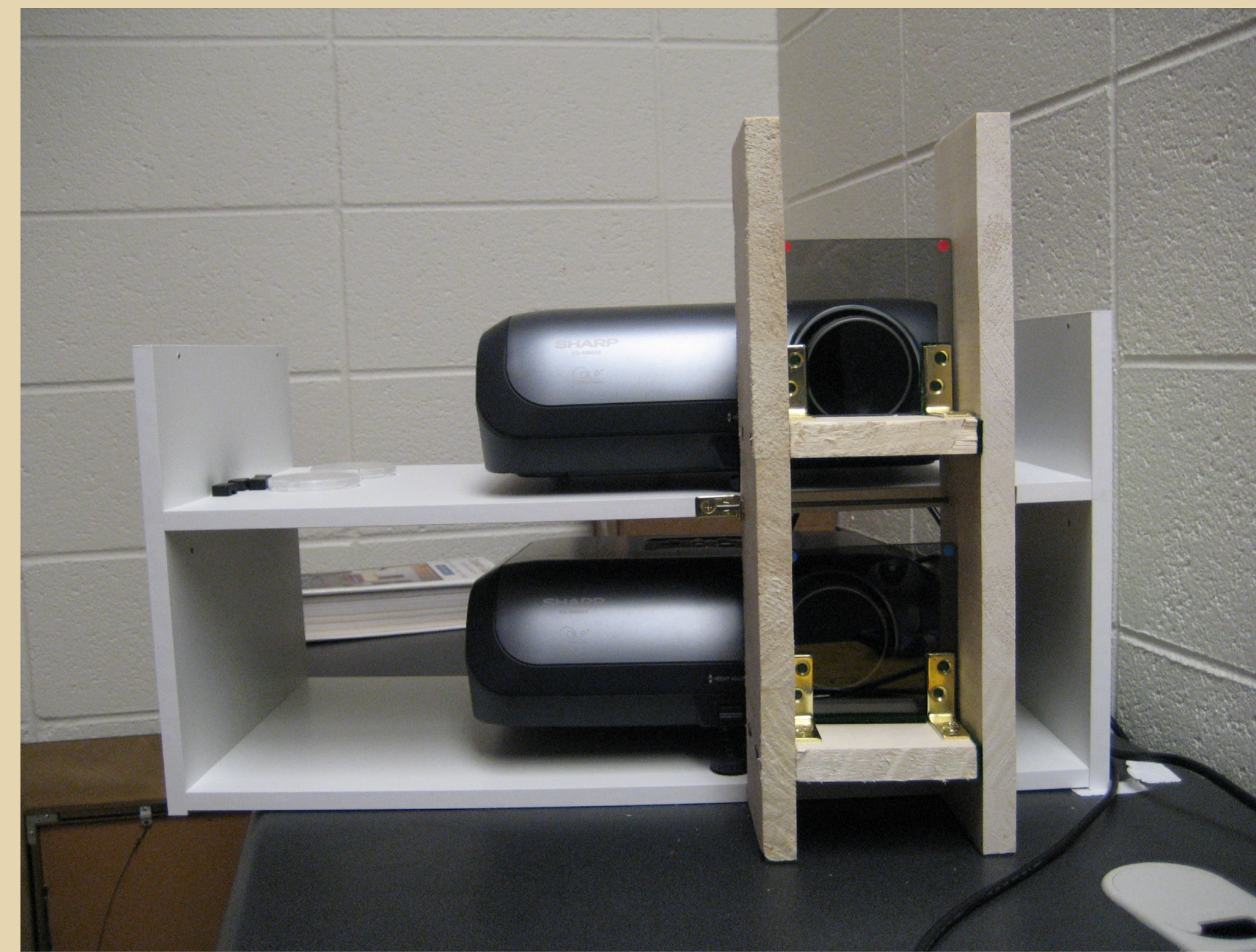
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Abstract

- The goal of this project was to create a portable 3D viewing device and accompanying software. Due to portability, we developed a calibration technique for quick setup. Then, using Java3D along with 3D object generation programs, we were able to develop dynamic virtual environments.

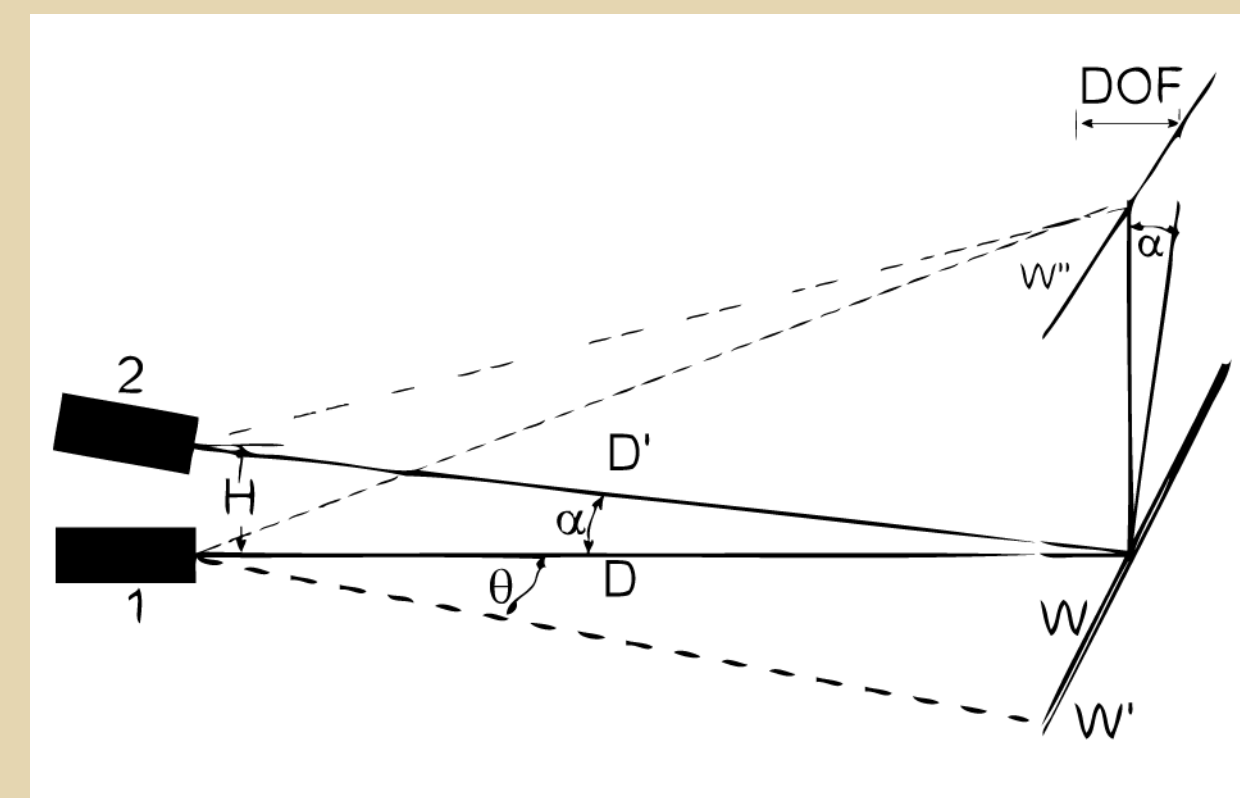
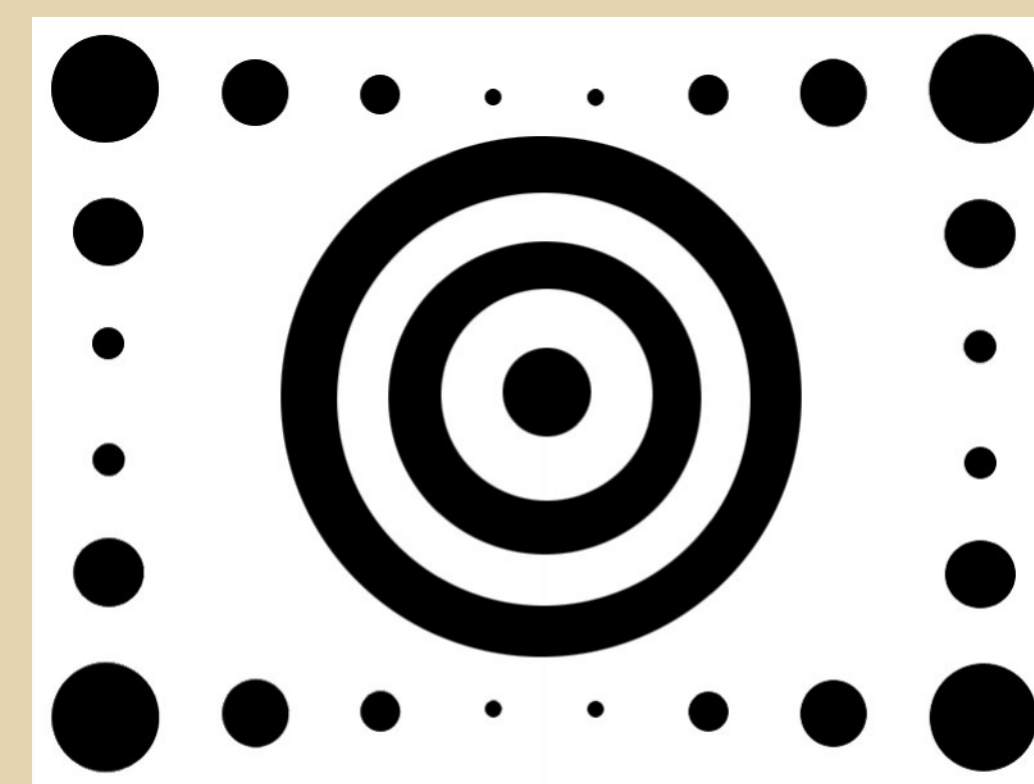
Physical Setup



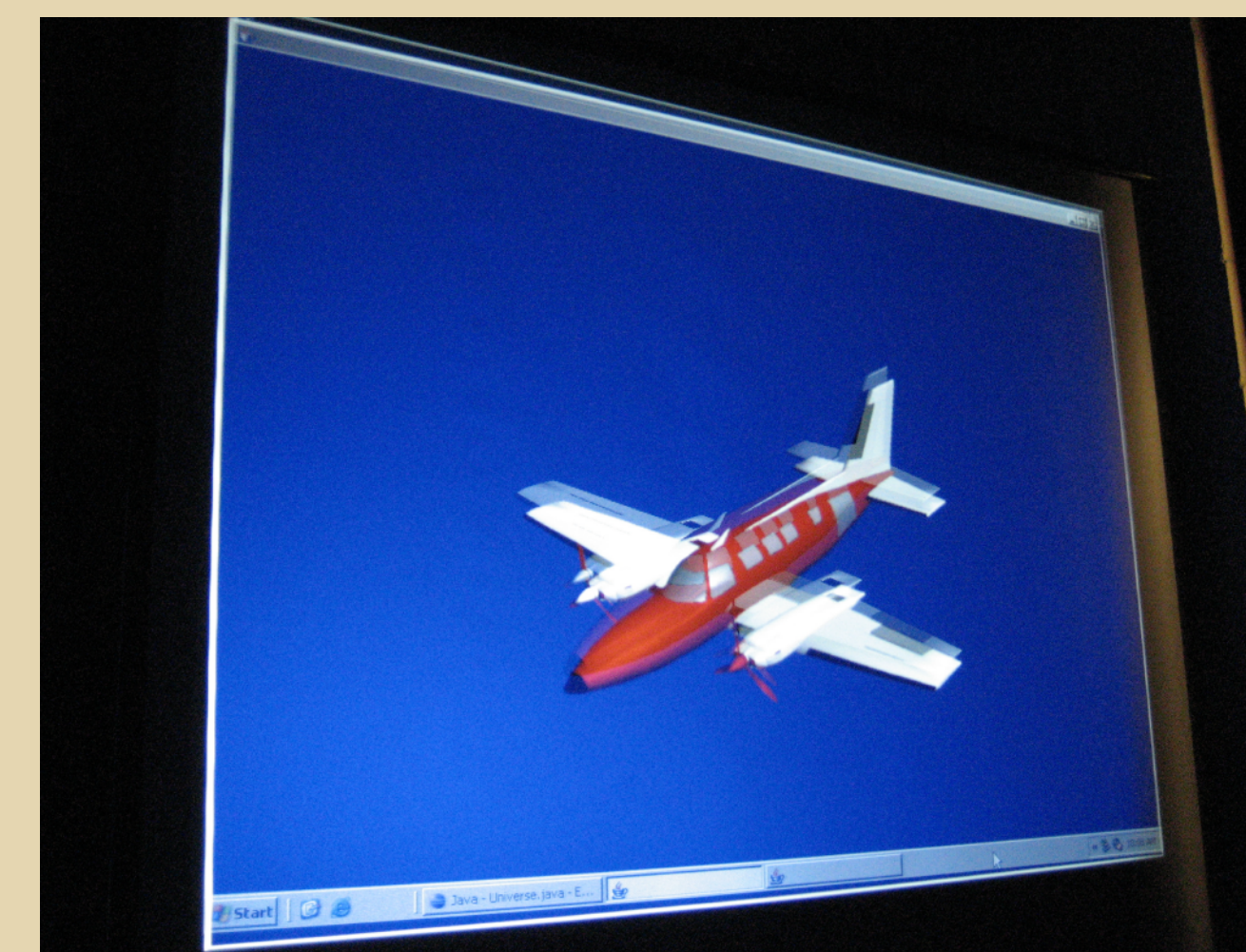
- Two projectors are used, each displaying what would be perceived by a single eye in a physical equivalent of the virtual environment.
- The projectors are placed in a rack which allows them to be vertically aligned in order to minimize the distance between the lenses.
- In front of each lens is a polarizing filter. The images are projected through these and onto a special silver screen, allowing the polarized light to reflect back to the viewers.
- Each observer wears a pair of glasses with polarized lenses, limiting the image each eye receives to that coming from the appropriate virtual camera.

Calibration

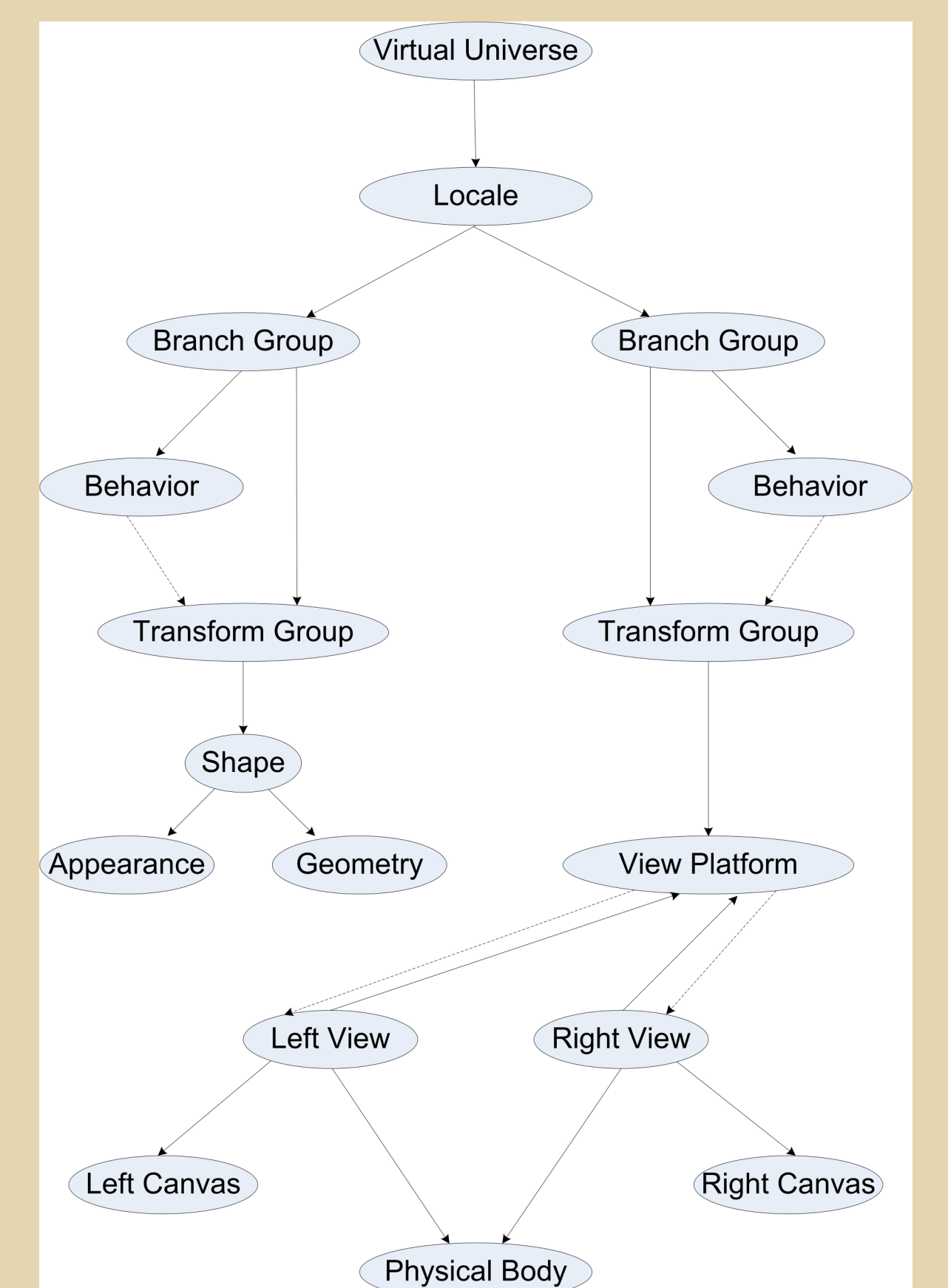
- Since the top projector must be tilted downwards for the dual images to appear in the same location, it is partially distorted. Most of this is corrected by the projector's built-in keystone correction.
- A simple test pattern allows for the projectors to be recalibrated quickly after transportation.



Java3D

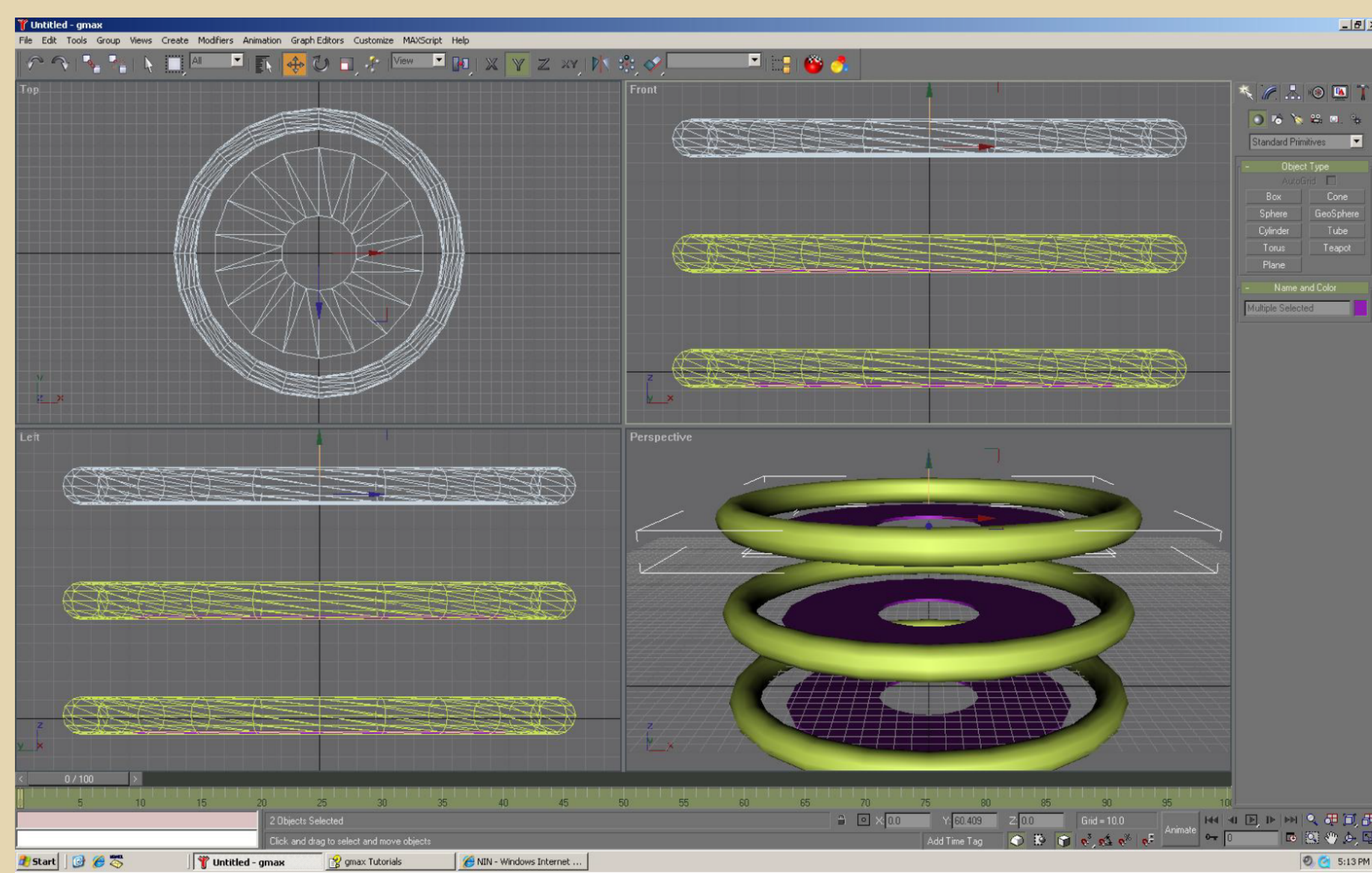


- The virtual objects and cameras are set up using Java3D.
- Java3D's implementation of scene graphs is flexible and allows for Views and content to be wholly separate or for a View to be connected to a particular object.
- Creation of the left and right images requires the use of two Views. These two Views are tied to the same "Physical Body" so that they stay in the same position relative to each other.



Content Creation

- Original content is created in programs such as GMax and converted to .obj format with a script.
- Once the .obj file is formed, it is easy to place the object into a Java3D Branch Group.



Future Work

- The current focus of the project is on making the creation of the virtual world a dynamic process that takes place at the time of the demonstration.
- By creating a set of interlocking .obj "building blocks" ahead of time and writing an environment creator, we plan to allow unfamiliar users to quickly construct and view their own large, complex, moving objects in 3D.

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 - <http://www.crystalcanyons.net>