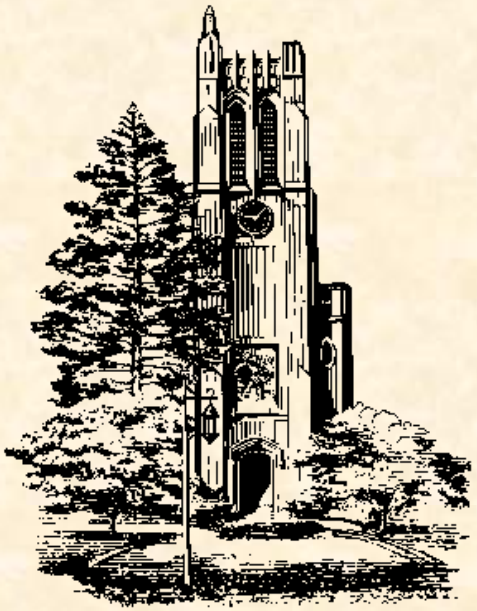
MICHIGAN STATE UNIVERSITY

Project Plan
Sparse Virtual Texturing



Team 2. Boeing

CSE 498, Collaborative Design

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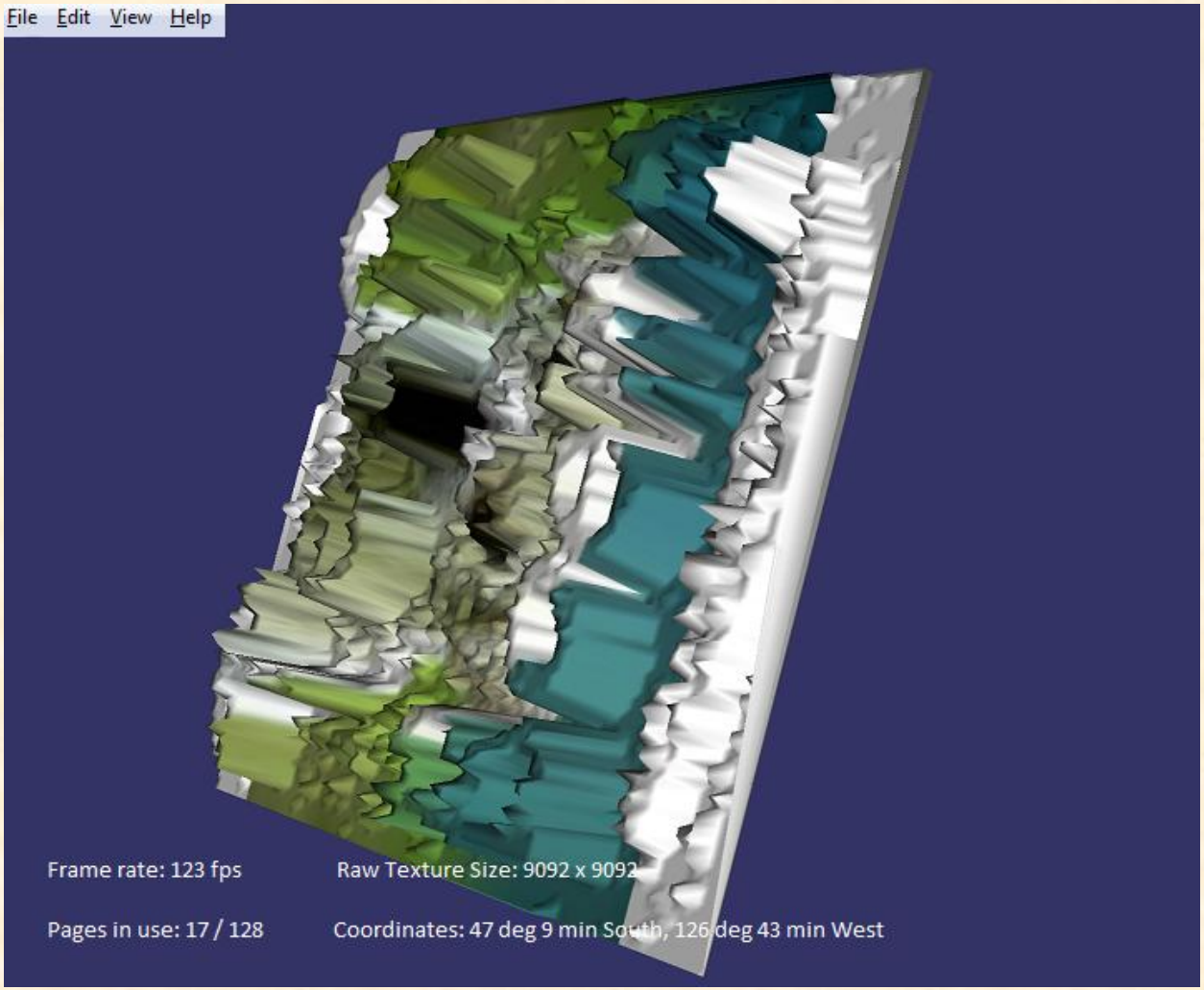
Functional Specifications

- Create a graphics library that implements Sparse Virtual Texturing (SVT); the use of large and/or highly detailed textures that wouldn't normally fit in texture memory.
- Convert SVT graphics library into an Open Scene Graph plug-in for use with all general OSG applications.
- Develop a visual application to demonstrate the functionality of our SVT graphics library.

Design Specifications

- Compatible with Open Scene Graph (OSG), ideally as a plug-in.
- Flexible enough for general use in a variety of Boeing visual applications.
- Display debug information, such as frame rate, page table info, mip-level
- Allow users to change key parameters to control quality and performance.

Screen Mockup



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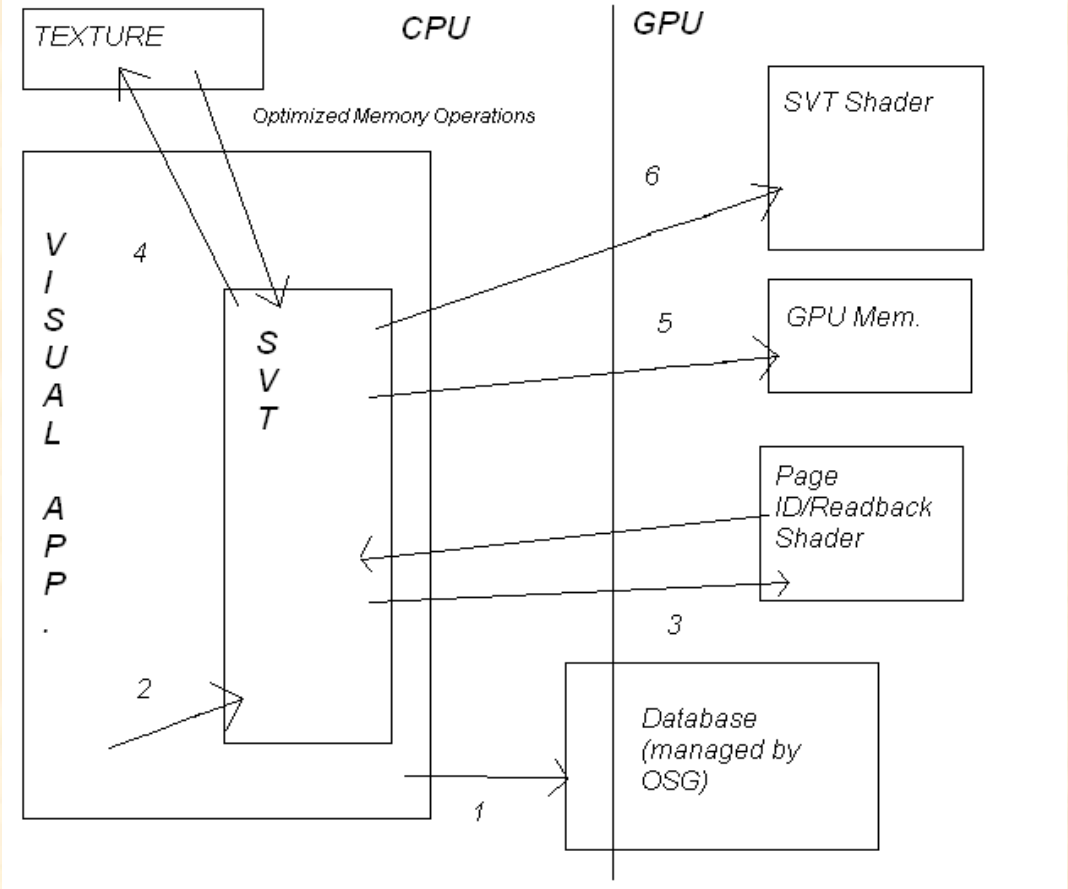
Technical Specifications

- Divide texture into pages of a uniform size
- Generate mip-map levels until highest mip-level occupies a single page
- Page Table stores addresses of each page, as well as whether a page is active, and if so what its mip level is
- Custom Readback shader stores requested texture coordinates in red and green channels
- CPU translates that data into sample counts for each page, used along with other information to determine desired mip level to load

Technical Specifications

- Requested texture pages spliced into one texture, with the page table keeping references to where each page is in the final texture
- Compress the texture real time for loading into texture memory, or load the texture in raw?
- Indirection shader will use page table to associate requested texture coordinates with actual loaded texture

Architecture Illustrated



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System Components

- Hardware Platforms
  - x86, x64
- Software Platforms / Technologies
  - OpenGL
  - OpenSceneGraph
  - Visual Studio 2005

Testing

- Testing on Pixel Shader v2.0
- Multiple image formats
- Test on Little Endian and Big Endian systems
- Frequent demos to Boeing on their machines
- Performance testing on as many different machines as feasible

Risks

- Scene Processing
  - SSE intrinsics
- Moving Memory
  - Different memory layouts
  - Trial and error
- Lack of documentation
  - Utilize available literature and open source