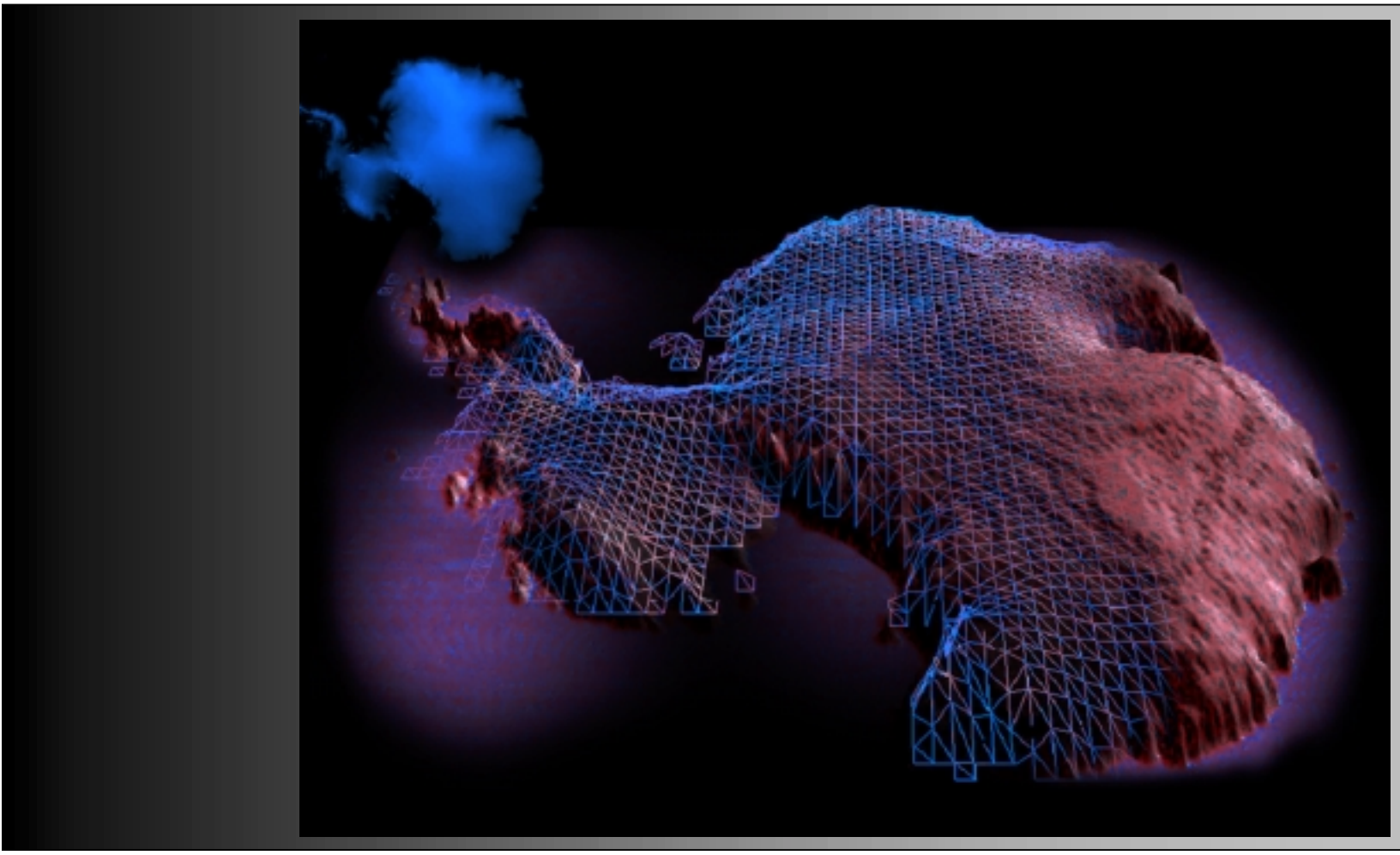
TerraForm3D

Terrain Modeling Software Installation Guide



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Section 1: Windows

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System Requirements

1. Video card that supports OpenGL
2. OpenGL drivers
3. POV-Ray version 3+ for DOS

Installation

If you have the TerraForm3D CD-ROM, the Windows intstallation of TerraForm3D is provided in the dirctory TerraForm3D/Windows/

1. Download POV-Ray for **DOS** from http://www.povray.org or install from provided media (Software\ThirdParty\POV-Ray\Windows\DOS). During installation, allow autoexec.bat to be modified.
2. Create a directory to put executables
3. Unzip all files into the directory created in step two. Unzipping utilities such as PKWare or WinZip (in the Software\ThirdParty\Utilties\Winzip folder on the CD-ROM) can be downloaded from http://www.download.com
4. To create icons, open Windows Explorer or My Computer and browse to where the files were unzipped to. Right click on TerraForm3D.exe and select “Create Shortcut”, rename the new icon to “TerraForm3D Terrain Modeler” and drag the icon to the desktop.
5. To add TerraForm3D to the Start menu, go to Start > Settings > Taskbar & Start menu. Under the Start Menu tab, select “Add” and follow the wizard to browse to the location where TerraForm3D files were unzipped, and add TerraForm3D.exe.

NOTE: If using the Windows version, POV-Ray for DOS requires 8.3 naming convention. TerraForm3D adds three characters to the terrain model name for output files. Terrain files MUST be named with no more than five characters plus the extension. E.g. terra.img is a good name, but terrain.img is not.

Section 2: UNIX

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System Requirements

1. Video card that supports OpenGL
2. OpenGL drivers
3. GLUI and GLUT libraries
4. POV-Ray version 3+
5. C++ compiler
6. Familiarity with **`make`**, **`tar`** and UNIX/Linux software installations

Installation

If you have the TerraForm3D CD-ROM, the UNIX intstallation of TerraForm3D is provided in the directory TerraForm3D/UNIX/

1. Download POV-Ray or install from provided media
2. Download or use source provided on provided media the GLUI and GLUT libraries. Install according to the installation guide for these packages. GLUI
3. Create a directory to put the source code (e.g. /usr/local/src/TerraForm3D/)
4. Untar all files into the directory created in step two.
5. Run **`make`**. Use macro CC=<your C++ compiler> to set the executable name of your C++ compiler.
6. Move the executable terraform3D to the user area (e.g. /usr/local/bin/)

URLs for needed libraries and packages

- POV-Ray http://www.povray.org
- OpenGL http://www.opengl.org
- Open3D (Digital's OpenGL) http://www.digital.com
- GLUI http://www.cs.unc.edu/~rademach/glui/
- GLUT http://reality.sgi.com/opengl/glut3/glut3.html

Section 3: Beowulf

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System Requirements

Hardware:

- Intel based computers
  - Try to keep the speed the same in all computers. Even though PVMPOV load balances the slower computers will still bring down the overall performance.
- Network cards in each computer
  - Use DEC Tulip based network cards such as from Netgear and Kingston
- Network switch
  - Use a switch that will allow for maximum network speed times the number of computers. For example using 100 Mbs network cards and eight computers, you need a switch that can handle 800 Mbs on the backplane.
- Video card that supports OpenGL on mother computer or install mesasoft for software emulation.

Software:

- Base installation of Linux with network and NFS support
- PVM http://www.epm.ornl.gov/pvm/
- LAM http://www.mpi.nd.edu/lam/
- POVRAY with PVM patch
- C++ compiler

System setup:

- Setup master computer with two network cards, one with real IP and second network card with an IP from the 192.168.x.x address space.
- Setup the slave computers with one network card and with an IP from the 192.168.x.x address space.

- Allow logins from master computer to slave computers without passwords
- Add all the computers in the cluster to the hosts file.
- Add to the **`hosts.allow`** file access of ALL for the master computer.
- Add to the **`hosts.equiv`** file the name of the master computer.
- Setup the NFS such that the parallel program will see the same working file structure on each computer. For example mount the master computers /work1 on /work1 on each of the slave computers and run the program from this area. This is not required for PVM or LAM but is required for running PVMPOV.
- Recompile the kernel on all computers so that it uses kernel based NFS with NFS version 3 support.

Installation

If you have the TerraForm3D CD-ROM, the UNIX installation of TerraForm3D is provided in the directory TerraForm3D/UNIX/

1. Download POV-Ray or install from provided media
2. Download or use source provided on provided media the GLUI and GLUT libraries. Install according to the installation guide for these packages. GLUI
3. Create a directory to put the source code (e.g. /usr/local/src/TerraForm3D/)
4. Untar all files into the directory created in step two.
5. Run **`make`**. Use macro `CC=<your C++ compiler>` to set the executable name of your C++ compiler.
6. Move the executable `terraform3D` to the user area (e.g. `/usr/local/bin/`)

Running

PVM

- Create a file with the names of the computers in the cluster in it.
- Start PVM buy running the command "**pvm <filename>**" where filename is the name of the file that has names of the computers in it.
- Type "quit" to get back to a command prompt. PVM will still be running.
- After you are done running the TerraForm3D software type "**pvm**". This will put you back at a PVM prompt. Type "halt" to stop the PVM software, and drop you back to a command prompt.
- For more options for the PVM software see the PVM documentation.

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- Run TerraForm3D as you would a non-parallel version, the parallelization will happen automatically.

URLs for needed libraries and packages

- **POV-Ray** http://www.povray.org
- **POV-Ray with PVM patch** http://www.luga.de/~flier/pvmpov
  OpenGL http://www.opengl.org
- **Open3D** (Digital's OpenGL) http://www.digital.com
- **GLUI** http://www.cs.unc.edu/~rademach/glui/
- **GLUT** http://reality.sgi.com/opengl/glut3/glut3.html