Archive-name: graphics/resources-list/part3

Last-modified: 1993/04/27

Computer Graphics Resource Listing : WEEKLY POSTING [PART 3/3]

Last Change : 27 April 1993

11. Scene generators/geographical data/Maps/Data files

DEMs (Digital Elevation Models)

DEMs (Digital Elevation Models) as well as other cartographic data

[huge] is available from spectrum.xerox.com [192.70.225.78], /pub/map.

Contact:

Lee Moore -- Webster Research Center, Xerox Corp. --

Voice: +1 (716) 422 2496

Arpa, Internet: Moore.Wbst128@Xerox.Com

[Check also on ncgia.ucsb.edu (128.111.254.105), /pub/dems -- nfotis]

Many of these files are also available on CD-ROM selled by USGS:

"1:2,000,000 scale Digital Line Graph (DLG) Data". Contains datas

for all 50 states. Price is about $28, call to or visit in offices

in Menlo Park, in Reston, Virginia (800-USA-MAPS).

The Data User Services Division of the Bureau of the Census also has

data on CD-ROM (TSO standard format) that is derived from USGS

1:100,000 map data. Call (301) 763-4100 for more info or they have

a BBS at (301) 763-1568.

[From Dr.Dobbs #198 March 1993:]

"The U.S. Defense Mapping Agency, in cooperation with their counterpart

agencies in CANADA, the U.K., and Australia, have released the Digital Chart

of the World (DCW). This chart consists of over 1.5 gigabytes of reasonable

quality vector data distributed on four CD-ROMS. .... includes coastlines,

rivers, roads, railrays, airports,cities, towns, spot elevations, and depths,

and over 100,000 place names."

It is ISO9660 compatible and only $200.00 available from:

U.S. Geological Survey

P.O. Box 25286

Denver Federal Center

Denver, CO 80225

Digital Distribution Services

Energy, Mines, and Resources Canada

615 Booth Street

Ottawa, ON

K1A 0E9 Canada

Director General of Military Survey

(Survey 3)

Elmwood Avenue

Feltham, Middlesex

TW13 7AH United Kingdom

Director of Survey, Australian Army

Department of Defense

Campbell Park Offices (CP2-4-24)

Campbell ACT 2601 Australia

Fractal Landscape Generators

Public Domain:

Many people have written fractal landscape generators. for example

for the Mac some of these generators were written by

pdbourke@ccu1.aukuni.ac.nz (Paul D. Bourke).

Many of the programs are available from the FTP sites and mail

archive servers. Check with Archie.

Commercial:

Vista Pro 3.0 for the Amiga from Virtual Reality Labs -- list price

is about $100. Their address is:

2341 Ganador court

San Luis Obispo,

Telephone or FAX (805) 545-8515

Scenery Animator (also for the Amiga) is of the same caliber with Vista Pro 2.

Check with:

Natural Graphics

P.O. Box 1963

Raklin, CA 95677

Phone (916) 624-1436

Don't forget to ask about companion programs and data disks/tapes.

Vista Pro 3 has been ported to the PCs.

CIA World Map II

[NOTE: this database is quite out of date, and not topologically structured.

If you need a standard for world cartographic data, wait for the

Digital Chart of the World. This 1:1M database has been produced from

the Defense Mapping Agency's ONCs and will be available, together with

searching and viewing software, on a number of CD-ROMs later this summer.]

Check into HANAUMA.STANFORD.EDU and UCSD.EDU (see ftp list above)

The CIA database consists of coastlines, rivers and political boundaries

in the form of line strokes. Also on hanauma.stanford.edu is a 720x360

array of elevation data, containing one ieee floating point number for

every half degree longitude and latitude.

A program for decoding the database, mfil, can be found on the machine pi1.arc.umn.edu (137.66.130.11).

There's another program, which reads a compressed CIA Data Bank file and builds a PHIGS hierachical structure. It uses a PHIGS extension known as polyline sets for performance, but you can use regular polylines. Ask Joe Stewart <joes@lpi.liant.com>.

The raw data at Stanford require the vplot package to be able to view it. (was posted in comp.sources.unix). To be more exact, you'll have to compile just the libvplot routines, not the whole package.

NCAR data

NCAR (National Center for Atmospheric Research) has many types of terrain data, ranging from elevation datasets at various resolutions, to information about soil types, vegetation, etc. This data is not free -- they charge from $40 to $90 or more, depending on the data volume and media (exabyte tape, 3480 cartridge, 9-track tape, IBM PC floppy, and FTP transfer are all available). Their data archive is mostly research oriented, not hobbyist oriented. For more information, email to ilana@ncar.ucar.edu.

UNC data tapes with voxel data

There are 2 "public domain" tapes with data for the comparison and testing of various volume rendering algorithms (mainly MRI and CT scans). These tapes are distributed by the SoftLab of UNC @ Chapel Hill. (softlab@cs.unc.edu)

The data sets (volume I and II) are also available via anonymous FTP from omicron.cs.unc.edu [128.109.136.159] in pub/softlab/CHVRTD

Many US agencies such as NASA publish CD-ROMs with many altimetry data from various space missions, eg. Viking for Mars, Magellan for Venus, etc. Especially for NASA, I would suggest to call the following address for more info:

National Space Science Date Center
Goddard Space Flight Center
Greenbelt, Maryland 20771
Telephone: (301) 286-6695
Email address: request@nssdca.gsfc.nasa.gov

The data catalog (*not* the data itself) is available online.
Internet users can telnet to nssdca.gsfc.nasa.gov (128.183.10.4) and log in as 'NODIS' (no password).
You can also dial in at (301)-286-9000 (300, 1200, or 2400 baud, 8 bits, no parity, one stop). At the "Enter Number:" prompt, enter MD and carriage return. When the system responds "Call Complete," enter a few more carriage returns to get the "Username:" and log in as 'NODIS' (no password).
NSSDCA is also an anonymous FTP site, but no comprehensive list of what's there is available at present.

Earth Sciences Data

There's a listing of anonymous FTP sites for earth science data, including imagery. This listing is called "Earth Sciences Resources on Internet", and you can get it via anonymous FTP from csn.org [128.138.213.21] in the directory COGS under the name "internet.resources.earth.sci"
Some sites include:
aurelie.soest.hawaii.edu [128.171.151.121]: pub/avhrr/images - AVHRR images

ames.arc.nasa.gov [128.102.18.3]: pub/SPACE/CDROM - images from Magellan and Viking missions etc.

pub/SPACE/Index contains a listing of files available in the whole archive (the index is about 200K by itself). There's also an e-mail server for the people without Internet access: send a letter to archive-server@ames.arc.nasa.gov (or ames!archive-server). In the subject of your letter (or in the body), use commands like:

send SPACE Index

send SPACE SHUTTLE/ss01.23.91

(Capitalization is important! Only text files are handled by the email server at present)

vab02.larc.nasa.gov [128.155.23.47]: pub/gifs/misc/landsat - Landsat photos in GIF and JPEG format

[It was shut down - nfotis; anyone has a copy of this archive??]

Others

Daily values of river discharge, streamflow, and daily weather data is available from EarthInfo, 5541 Central Ave., Boulder CO 80301. These disks are expensive, around $500, but there are quantity discounts.

Check vmd.cso.uiuc.edu [128.174.5.98], the wx directory carries data regarding surface analysis, weather radar, and sat view pics in GIF format (updated hourly)

pioneer.unm.edu [129.24.9.217] is the Space and Planetary Image Facility (located on the University of New Mexico campus) FTP server. It provides Anonymous FTP access to >150 CD-ROMS with data/images.

A disk with earthquake data, topography, gravity, geopolitical info is available from NGDC (National Geophysical Data Center), 325 Broadway,

Boulder, CO 80303. (303) 497-6958.

EOSAT (at least in the US) now sells Landsat MSS data older than two years
old for $200 per scene, and they have been talking about a similar deal
for Landsat TM data. The MSS data are 4 bands, 80 meter resolution.

Check out anonymous FTP to ftp.ncsa.uiuc.edu in
UNIX/PolyView/alpha-shape for a tool that creates convex hulls
alpha-shapes (a generalization of the convex hull) from 3D point sets.

The GRIPS II (Gov. Raster Image Processing Software) CD-ROM
is available from CD-ROM Inc. at 1-800-821-5245 for $49.

Code for viewing ADRG (Arc Digitised Raster Graphics) files is
available on the GRIPS II CD-ROM. The U.S. Army Engineer
Topographic Labs (Juan Perez) code is also available via FTP
(adrg.zip archive in spectrum.xerox.com)

NRCC range data

Rioux M., Cournoyer L. "The NRCC Three-Dimensional Image Data Files",
Tech. Report, CNRC 29077, National Research Council Canada,
Ottawa, Canada, 1988

[From what I understand, these data are from a laser range finder,
and you can a copy for research purposes]

12. 3D scanners - Digitized 3D Data

a. Cyberware Labs, Monterey, CA, manufactures a 3D color laser digitizer
which can be used to model parts of, or a complete, human body.
They run a service bureau also, so they can digitize models for you.

Address:

Cyberware Labs, Inc
8 Harris Ct, Suite 3D

Monterey, CA 93940

Phone: (408)373-1441, Fax: (408)373-3582

b. Polhemus makes a 6D input device (actually a couple of models)
that senses position (3D) and *orientation* (+3D) based on electromagnetic
field interference. This equipment is also incorporated in the
VPL Dataglove.
This hardware is also called ISOTRACK, from Keiser Aerospace.
Ascension Technology makes a similar 3D input device.
There is a company, Applied Sciences(?), that makes a 3D input
device (position only) based on speed of sound triangulation.

c. A company that specializes in digitizing is Viewpoint. You can ask
for Viewpoint's _free_ 100 page catalog full of ready to
ship datasets from categories such as cars, anatomy, aircraft,sports,
boats, trains, animals and others. Though these objects are
quite expensive, the cataloge is nevertheless of interest for it
has pictures of all the available objects in wireframe , polygon mesh.

Contact:

Viewpoint,

870 West Center,

Orem, Utah 84057

fax# 801-224-2272

Some addresses for companies that make digitizers:

Ascension Technology

Bird, Flock of Birds, Big Bird: 6d trackers

P.O. Box 527,

Burlington, VT 05402

Phone: (802) 655-7879, Fax: (802) 655-5904

Polhemus Incorporated

Digitizer: 6d trackers

P.O. Box 560, Hercules Dr.

Colchester, Vt. 05446

Tel: (802) 655-3159

Logitech Inc.

Red Baron, ultrasonic 6D mouse

6506 Kaiser Dr.

Freemont, CA 94555

Tel: (415) 795-8500w

Shooting Star Technology

Mechanical Headtracker

1921 Holdom Ave.

Burnaby, B.C. Canada V5B 3W4

Tel: (604) 298-8574

Fax: (604) 298-8580

Spaceball Technologies, Inc.

Spaceball: 6d stationary input device

600 Suffolk Street

Lowell, MA, 01854

Tel: (508) 970-0330

Fax: (508) 970-0199

Tel in Mountain View: (415) 966-8123

Transfinite Systems

Gold Brick: PowerGlove for Macintosh

P.O. Box N

MIT Branch Post Office

Cambridge, MA 02139-0903

Tel: (617) 969-9570

email: D2002@AppleLink.Apple.com

VPL Research, Inc.

EyePhone: head-mounted display

DataGlove: glove/hand input device

VPL Research Inc.

950 Tower Lane

14th Floor

Foster City, CA 94404

Tel: (415) 312-0200

Fax: (415) 312-9356

SimGraphics Engineering

Flying Mouse: 6d input device

1137 Huntington Rd. Suite A-1

South Pasadena, CA 91030-4563

13. Background imagery/textures/datafiles

First, check in the FTP places that are mentioned in the FAQ or in the FTP

list above.

24-bit scanning:

Get a good 24-bit scanner, like Epson's. Suggested is an SCSI port for

speed. Eric Haines had a suggestion in RT News, Volume 4, #3 :

scan textures for wallpapers and floor coverings, etc. from doll

house supplies.

So you have a rather cheap way to scan patterns that don't have

scaling troubles associated with real materials and scanning area.

Books with textures:

Find some houses/books/magazines that carry photographic material.

Educorp, 1-619-536-9999, sells CD-ROMS with various imagery - also

a wide variety of stock art is available.

Stock art from big-name stock art houses, such as Comstock,

UNIPHOTO, and Metro Image Base, is available.

In Italy, there's a company called Belvedere that makes such books

for the purpose of clipping their pages for inclusion in your

graphics work. Their address is:

Edition Belvedere Co. Ltd.,

00196 Rome Italy,

Piazzale Flaminio, 19

Tel. (06) 360-44-88, Fax (06) 360-29-60

Texture Libraries:

a. Mannikin Sceptre Graphics announced TexTiles, a set of 256x256 24-bit

textures. Initial shipments in 24-bit IFF (for Amigas), soon in 24-bit

TIFF format. Algorithmically built for tiled surfaces. SRP is $40 / volume

(each volume = 40 images @ 10 disks). Demo disks for $5 are available.

Contact:

Mannikin Sceptre Graphics

1600 Indiana Ave.

Winter Park, FL 32789

Phone: (407) 384-9484

b. ESSENCE is a library of 65 (sixty-five) new algoritmic textures for Imagine

by Impulse, Inc. These textures are FULLY compatible with the floating point

versions of Imagine 2.0, Imagine 1.1, and even Turbo Silver.

Written by Steve Worley.

For more info contact:

Essence Info

Apex Software Publishing

405 El Camino Real Suite 121

Menlo Park CA 94025 USA

[What about Texture City ??]

14. Introduction to rendering algorithms

a. Ray-Tracing:

I assume you have a general understanding of Computer Graphics. No? Then read

some of the books that the FAQ contains. For Ray-Tracing, I would

suggest:

An Introduction to Ray Tracing, Andrew Glassner (ed.), Academic Press

Note that I have not read the book, but I feel that you can't be wrong

using his book. An errata list was posted in comp.graphics by Eric Haines

(erich@eye.com)

There's a more concise reference also:

Roman Kuchkuda , UNC @ Chapel Hill: "An Introduction to Ray Tracing", in

"Theoretical Foundations for Computer Graphics and CAD", ed. R.A.E.Earnshaw,

NATO AS, Vol. F-40., pp. 1039-1060. Printed by Springer-Verlag, 1988.

It contains code for a small, but fundamentally complete ray-tracer.

b. Z-buffer (depth-buffer)

A good reference is:

Procedural Elements for Computer Graphics, David F. Rogers,

McGraw-Hill, New York, 1985, pages 265-272 and 280-284.

c. Others:

[More info is needed -- nfotis]

15. Where can I find the geometric data for the:

a. Teapot ?

"Displays on Display" column of IEEE CG&A Jan '87 has the whole
story about origin of the Martin Newell's teapot. The article also has
the bezier patch model and a Pascal program to display the wireframe
model of the teapot.
IEEE CG&A Sep '87 in Jim Blinn's column "Jim Blinn's Corner" describes
an another way to model the teapot; Bezier curves with rotations for
example are used.
The OFF and SPD packages have these objects, so you're advised to get
them to avoid typing the data yourself. The OFF data is triangles at
a specific resolution (around 8x8[x4 triangles] meshing per patch).
The SPD package provides the spline patch descriptions and performs a
tessellation at any specified resolution.

b. Space Shuttle ?

Tolis Lerios <tolis@nova.stanford.edu> has built a list of Space Shuttle
datafiles. Here's a summary (From his sci.space list):

model1:

A modified version of the newsgroup model (model2)
406 vertices (296 useful, i.e. referred to in the polygon descriptions.)
389 polygons (233 3-vertex, 146 4-vertex, 7 5-vertex, 3 6-vertex).
Payload doors non-existent.
Units: unknown.

Simon Marshall (S.Marshall@sequent.cc.hull.ac.uk) has a copy. He

said there is no proprietary information associated with it.

model2:

The newsgroup model, in OFF format. You can find it in

gondwana.ecr.mu.oz.au , file pub/off/objects/shuttle.geo

hanauma.stanford.edu , /pub/graphics/Comp.graphics/objects/shuttle.data

model3:

The triangles' model.

This model is stored in several files, each defining portions of the model.

Greg Henderson (henders@infonode.ingr.com) has a copy. He did

not mention any restriction on the model's distribution.

model4:

The NASA model.

The file starts off with a header line containing three real numbers,

defining the offsets used by Lockheed in their simulations:

<x offset> <y offset> <z offset>

From then on, the file consists of a sequence of polygon descriptions

3473 vertices.

2748 polygons (407 3-vertex, 2268 4-vertex, 33 5-vertex, 14 6-vertex,

10 7-vertex, 8 8-vertex, 8 12-vertex, 2 13-vertex, 2 15-vertex,

17 16-vertex, 2 17-vertex, 2 18-vertex, 3 19-vertex, 8 24-vertex).

Payload doors closed.

Units: inches.

Jon Berndt (jon@l14h11.jsc.nasa.gov) seems to be responsible for the model

Proprietary info: unknown

model5:

The old shuttle model.

The file consists of a sequence of polygon descriptions.

104 vertices.

452 polygons (11 3-vertex, 41 4-vertex).

Payload doors open.

Units: meters.

We have been using this model at STAR Labs, Stanford University, for some years now. Contact me (tolis@nova.stanford.edu) or my supervisor Scott Williams (scott@star5.stanford.edu) if you want a copy.

16. Image annotation software

a. Touchup runs in Sunview and is pretty good. It reads in rasterfiles, but even if your image isn't normally stored in rasterfile format you could use screendump to make it a rasterfile.

b. Idraw (part of Stanford's InterViews distribution) can handle some image formats in addition to being a MacDraw like tool. I'm not sure exactly what they are.

You can ftp the idraw's binary from interviews.stanford.edu.

c. Tgif is another MacDraw like tool that can handle X11 bitmap (xbm) and X11 pixmap (xpm) formats. If the image you have is in formats other than xbm or xpm, you can get the pbmplus toolkit to convert things like gif or even some Macintosh formats to xpm.

Tgif's sources are available in the pub directory on cs.ucla.edu

(Version 2.12 of tgif at patchlevel 7 plus patch8 and patch9)

d. Use the editimage facility of KHOROS (see below).

This is just one utility in the overall system- you can essentially do all

your image processing and macdraw-type graphics using this package.

e. You might be able to get by with PBMPlus. pbmtext gives you text output bitmaps which can be overlaid on top of your image.

f. 'ice' requires Sun hardware running OpenWindows 3.It's a PostScript-based graphical editor,and it's available for anonymous ftp from Internet host eo.soest.hawaii.edu (128.171.151.12). Requires Sun C++ 2.0 and two other locally developed packages, the LXT library (an Xlib-based toolkit) and a small C++ class library. All files (pub/ice.tar.Z, pub/lxt.tar.Z and pub/ldgoc++.tar.Z) are available in compressed tar format. pub/ice.tar.Z contains a README that gives installation instructions, as well as an extensive man page (ice.1).

A statically-linked compressed executable pub/ice-sun4.Z for SPARC systems is also available for ftp.

All software is the property of Columbia University and may not be redistributed without permission.

ice means Image Composition Environment and it's an imaging tool that allows raster images to be combined with a wide variety of PostScript annotations in WYSIWYG fashion via X11 imaging routines and NeWS PostScript rasterizing.

g. Use ImageMagick to annotate an image from your X server. Pick the position of your text with the cursor and choose your font and pen color from a pull-down menu. ImageMagick can read and write many of the more popular image formats. ImageMagick is available as export.lcs.mit.edu: contrib/ImageMagick.tar.Z or at your nearest X11 archive.

17. Scientific visualization stuff

X Data Slice (xds)

Bundled with the X11 distribution from MIT,

in the contrib directory. Available at ftp.ncsa.uiuc.edu [141.142.20.50]

(either as a source or binaries for various platforms).

National Center for Supercomputing Applications (NCSA) Tool Suite

Platforms: Unix Workstations (DEC, IBM, SGI, Sun)

Apple MacIntosh

Cray supercomputers

Availability: Now available. Source code in the public domain.

FTP from ftp.ncsa.uiuc.edu.

Contact: National Center for Supercomputing Applications

Computing Applications Building

605 E. Springfield Ave.

Champaign, IL 61820

Cost: Free (zero dollars).

The suite includes tools for 2D image and 3D scene analysis and visualization.

The code is actively maintained and updated.

Spyglass

They sell commercial versions of the NCSA tools. Examples are:

Spyglass Dicer (3D volumetric data analysis package)

Platform: Mac

Spyglass Transform (2D data analysis package)

Platforms: Mac, SGI, Sun, DEC, HP, IBM

Contact:

Spyglass, Inc.

P.O. Box 6388

Champaign, IL 61826

KHOROS 1.0 Patch 5

Available via anonymous ftp at pprg.eece.unm.edu (129.24.24.10).

cd to /pub/khoros to see what is available. It is HUGE (> 100 MB), but good.

Needs Unix and X11R4. Freely copied (NOT PD), complete with sources

and docs. Very extensive and at its heart is visual programming.

Khoros components include a visual programming language, code

generators for extending the visual language and adding new application

packages to the system, an interactive user interface editor, an

interactive image display package, an extensive library of image and

signal processing routines, and 2D/3D plotting packages.

See comp.soft-sys.khoros on Usenet and the relative FAQ for more info....

Contact:

The Khoros Group

Room 110 EECE Dept.

University of New Mexico

Albuquerque, NM 87131

Email: khoros-request@chama.eece.unm.edu

MacPhase

Analysis & Visualization Application for the Macintosh.

Operates on 1D and 2D data arrays. Import/Export several different file

formats. Several different plotting options such as gray scale,

color raster, 3D Wire frame, 3D surface, contour, vector, line, and

combinations. FFTs, filtering, and other math functions, color look up

editor, array calculator, etc. Shareware, available via anonymous ftp from

sumex-aim.stanford.edu in the info-mac/app directory.

For other information contact Doug Norton (e-mail: 74017.461@@compuserve.com)

IRIS Explorer

It's an application creation system developed by Silicon
Graphics that provides visualisation and analysis functionality for
computational scientists, engineers and other scientists. The Explorer
GUI allows users to build custom applications without having to write
any, or a minimal amount of, traditonal code. Also, existing code can
be easily integrated into the Explorer environment. Explorer currently
is available now on SGI and Cray machines, but will become available on
other platforms in time. [Bundled with every new SGI machine, as far as
I know]

See comp.graphics.explorer or comp.sys.sgi for discussion of the package.

There are also two FTP servers for related stuff, modules etc.:

ftp.epcc.ed.ac.uk [129.215.56.29]

swedishchef.lerc.nasa.gov [139.88.54.33] - mirror of the UK site

apE

Back in the 'old good days', you could get apE for nearly free.
Now has gone commercial and the following vendor supplies it:

TaraVisual Corporation
929 Harrison Avenue
Columbus, Ohio 43215
Tel: 1-800-458-8731 and (614) 291-2912
Fax: (614) 291-2867

Cost:

$895 (plus tax); runtime version with a site-license for a single user
(at a time), no limit on the number of machines in a cluster.

$895 includes support/maintenance and upgrades.

Source code more. Additional user licenses $360.

The name of the package has become apE III (TM).

Khoros is very similar to apE on philosophy, as are AVS and Explorer.

See also:

comp.graphics.avs

Platforms: CONVEX, CRAY, DEC, Evans & Sutherland, HP, IBM, Kubota,

Set Technologies, SGI, Stardent, SUN, Wavetracer

Availability: AVS4 available on all the above:

For all UNIX workstations.

Contact:

Advanced Visual Systems Inc.

300 Fifth Ave.

Waltham, MA 02154

(617)-890-4300 Telephone

(617)-890-8287 Fax

avs@avs.com Email

Advanced Visual Systems Inc. for: CRAY, HP, IBM, SGI, Stardent, SUN

CONVEX for CONVEX

Advanced Visual Systems Inc. or CRAY for CRAY

DEC for DEC

Evans & Sutherland for Evans & Sutherland

Advanced Visual Systems Inc. or IBM for IBM

Kubota Pacific Inc. for Kubota

Set Technologies for Set Technologies

Wavetracer for Wavetracer

FTP Site: for modules, data sets, other info:

avs.ncsc.org (128.109.178.23)

In a nutshell it's a package of the same genre as AVS,Explorer,etc.

It seems more a image processing system than a generic SciVi system (IMHO)

Major elements are:

- a visual programming language, which automatically exploits the inherent

parallelism

- a code generator which converts the graph to a standalone program

Iconified libraries present a rich set of point, filter, io, transform,

morphological, segmentation, and measurement operations.

A flow library allows graphs to employ broadcast, merge,

synchronization, conditional, and sequencing control strategies.

WIT delivers an object-oriented, distributed, visual programming

environment which allows users to rapidly design solutions to their

imaging problems. Users can consolidate both software and hardware

developments within a complete CAD-like workspace by adding their

own operators (C functions), objects (data structures), and servers

(specialized hardware). WIT runs on Sun, HP9000/7xx, SGI and supports

Datacube MV-20/200 hardware allowing you to run your graphs in real-time.

For a free WIT demo disk, call, FAX, or e-mail (poon@ee.ubc.ca)

us stating your complete name, address, voice, FAX, e-mail info.

and desired platform.

Pricing: WIT for Sparc, one yr. free upgrades, 30 days

technical support.....$5000 US

Academic institutions: discounts available

Contact:

Logical Vision Ltd.

Suite 108-3700 Gilmore Way

Burnaby, B.C., CANADA

Tel: 604-435-2587

Fax: 604-435-8840

Terry Arden <poon@ee.ubc.ca>

A system for visually exploring the output of 5-D gridded data sets

such as those made by weather models. Platforms:

SGI IRIS with VGX, GTX, TG, or G graphics,

SGI Crimson or Indigo (R4000, Elan graphics suggested), IRIX 4.0.x

IBM RS/6000 with GL graphics, AIX version 3 or later;

Stardent GS-1000 and GS-2000 (with TrueColor display)

In any case, 32 (or more) MB of RAM are suggested.

You can get it freely (thanks to NASA support) via anonymous ftp:

ftp iris.ssec.wisc.edu (or ftp 144.92.108.63), then

ftp> cd pub/vis5d

ftp> ascii

ftp> get README

ftp> bye

NOTE: You can find the package also on wuarchive.wustl.edu in the

graphics/graphics/packages directory.

Read section 2 of the README file for full instructions

on how to get and install VIS-5D.

Contact:

Bill Hibbard (whibbard@vms.macc.wisc.edu)

Brian Paul (bpaul@vms.macc.wisc.edu)

DATAexplorer (IBM)

Platforms : IBM Risc System 6000, IBM POWER Visualization Server

(SIMD mesh 32 i860s, 40 MHz)

Working on (announced) : SGI, HP, Sun

Contact:

Your local IBM Rep. For a trial package ask your rep to contact :

David Kilgore

Data Explorer Product Marketing

Wavefront

Data Visualizer, Personal Visualizer, Advanced Visualizer.

Platforms: SGI, SUN, IBM RS6000, HP, DEC

Availability:

Available on all the above platforms from Wavefront

Technologies. Educational programs and site licenses are

available.

Contacts:

Mike Wilson (mike@wti.com)

Wavefront Technologies, Inc.

530 East Montecito Street

Santa Barbara, CA 93103

Wavefront Europe

Guldenspoorstraat 21-23

B-9000 Gent, Belgium

Wavefront Technologies Japan

17F Shinjuku-sumitomo Bldg

2-6-1 Nishi-shinjuku, Shunjuku-Ku

Tokyo 168 Japan

PLOT3D and FAST from NASA Ames

These packages are distributed from COSMIC at least

(for FAST ask Pat Elson <pelson@nas.nasa.gov> for

distribution information). In general, these codes are for US

citizens only :-(

On the contrib tape of X11R5. Its specialty is display of up

to 64 data sets (2D).

National Center for Atmospheric Research. One of the original graphics

packages. Runs on Sun, RS6000, SGI, VAX, Cray Y-MP, DecStations, and more.

Contact:

Graphics Information

NCAR Scientific Computing Division

P.O. Box 3000

Boulder, CO 80307-3000

scdinfo@ncar.ucar.edu

Cost:

.edu

$750 Unlimited users

.gov

$750 1 user

$1500 5 users

$3000 25 users

.com users multiply .gov * 2.0

An environment for scientific computing and visualization.

Based on an array oriented language, IDL includes 2D and 3D

graphics, matrix manupulation, signal and image processing,
basic statistics, gridding, mapping, and a widget based system
for building GUI for IDL applications (Open Look, Motif, or
MS-Windows).
Environments: DEC (VMS and Ultrix), HP, IBM RS6000, SGI, Sun,
Microsoft Windows. (Mac version in progress)
Cost: $1500 to $3750, Educational and quantity discounts
available.
See also: comp.lang.idl-pvwave (the IDL-PVWAVE bundle)
Contact: Research Systems Inc.
777 29th Street, Suite 302
Boulder, CO 80303
Phone: 303-786-9900
E-mail: info@rsinc.com
Demo available via FTP. Call or E-mail for details.
"A lot of people are using IDL with a package called SIPS. This was
developed at the University of Colorado (Boulder) by some people working
for Alex Goetz. You might try contacting them if you already have IDL
or would be willing to buy it. It's a few thousand dollars (American) I
expect for IDL and the other should be free. Those are the general
purpose packages I've heard of, besides what TerraMar has.
SIPS _was_ written for AVIRIS imagery. I'm not sure how general purpose
it is. You would have to contact Goetz or one of his people and ask. I
have another piece of software (PCW) that does PC and Walsh
transformations with pseudocoloring and clustering and limited image
modification (you can compute an image using selected components). I've

used it on 70 megabyte AVIRIS images without problems, but for the best speed you need an external DSP card. It will work without it, but large images take quite a while (50-70 times as long) to process. That's a freebie if you want it"

"My favorite is IDL (Interactive Data Language) from Research Systems, Inc. IDL is in my opinion, much better and infinitely easier. Its programming language is very strong and easy -- very Pascal-like. It handles the number-crunching very well, also. Personally, I like doing the number-crunching with IDL on the VAX (or Mathematica, Igor, or even Excel on the Mac if it's not too hairy), then bringing it over to NIH Image for the imaging part. I have yet to encounter any situation which that combination couldn't handle, and the speed and ease of use (compared to IRAF) was incredible. By the way, it's mostly astronomical image processing which I've been doing. This means image enhancement, cleaning up bad lines/pixels, and some other traditional image processing routines. Then, for example, taking a graph of intensity versus position along a line I choose with the mouse, then doing a curve fit to that line (which I might do like in KaleidaGraph.) "

[For IDL call Research Systems , for PV-WAVE call Precision Visuals and for SIPS call University of Colorado @ Boulder . From what I can understand, you can get packaged programs from Research Systems, though -- nfotis]

Visual3

contact Robert Haimes, MIT

FieldView

An interactive program designed to assist an engineer in

investigating fluid dynamics data sets.

Platforms: SGI, IBM, HP, SUN, X-terminals

Availability: Currently available on all of the above

platforms. Educational programs and volume

discounts are available.

Contact:

Intelligent Light

P.O. Box 65

Fair Lawn, NJ 07410

Steve Kramer (kramer@ilight.com)

SciAn

SciAn is primarily intended to do 3-D visualizations of data in an

interactive environment with the ability to generate animations using

frame-accurate video recording devices. A user manual, on-line help, and

technical notes will help you use the program.

Cost : 0 (Free), source code provided via ftp.

Platforms : SGI 4D machines and IBM RS/6000 with the GL card + Z-buffer

Where to find it:

ftp.scri.fsu.edu [144.174.128.34] : /pub/SciAn

A mirror is monu1.cc.monash.edu.au [130.194.1.101] : /pub/SciAn

[From the README :]

Scry is a distributed image handling system that pro-

vides image transport and compression on local and wide area

networks, image viewing on workstations, recording on video

equipment, and storage on disk. The system can be distri-

buted among workstations, between supercomputers and works-

tations, and between supercomputers, workstations and video animation controllers. The system is most commonly used to produce video based movie displays of images resulting from visualization of time dependent data, complex 3D data sets, and image processing operations. Both the clients and servers run on a variety of systems that provide UNIX-like C run-time environments, and 4BSD sockets.

The source is available for anonymous ftp:

csam.lbl.gov [128.3.254.6] : pub/scry.tar.Z

Contact:

Bill Johnston, (wejohnston@lbl.gov, ...ucbvax!csam.lbl.gov!johnston)

or

David Robertson (dwrobertson@lbl.gov, ...ucbvax!csam.lbl.gov!davidr)

Imaging Technologies Group

Lawrence Berkeley Laboratory

1 Cyclotron Road

Berkeley, CA 94720

SVLIB is an X-Windows widget set based on the OSF (Open Software Foundation) Motif widget set. SVLIB widgets are macro-widgets comprising lower level Motif widgets such as buttons, scrollbars, menus, and drawing areas. It is designed to address the reusability of 2D visualization routines and each widget in the library is an encapsulation of a specific visualization technique such as colormap manipulation, image display, and contour plotting. It is targetted to run on UNIX workstations supporting OSF/Motif. Currently, only color monitors are supported. Since SVLIB is a collection of widgets

developed in the same spirit as the OSF/Motif user interface widget set, it integrates seamlessly with the Motif widgets. Programmers using SVLIB widgets see the same interface and design as other Motif widgets.

FVS is a visualization software for Computational Fluid Dynamics (CFD) simulations. FVS is designed to accept data generated from these simulations and apply various visualization techniques to present these data graphically.

FVS accepts three-dimensional multi-block data recorded in NCSA HDF format.

iti.gov.sg [192.122.132.130] : /pub/svlib (Scientific Visualization) /pu/fvs; These directories contain demo binaries for Sun4/SGI

Cost : US$200 for academic and US$300 for non-academic institutions.

(For each of the above items). You're getting the source for the licence.

Contact

Miss Quek Lee Hian

Member of Technical Staff

Information Technology Institute

National Computer Board

NCB Building

71, Sicence Park Drive

Singapore 0511

Republic of Singapore

Tel : (65)7720435

Fax : (65)7795966

Email : leehian@iti.gov.sg

GVLware Distribution:

Bob - An interactive volume renderer for the SGI

Raz - A disk based movie player for the SGI

Icol - Motif color editor

The Army High Performance Computing Research Center (AHPCRC) has been developing a set of tools to work with large time dependent 2D and 3D data sets. In the Graphics and Visualization Lab (GVL) we are using these tools along side standard packages, such as SGI Explorer and the Utah Raster Toolkit, to render 3D volumes and create digital movies.

A couple of the more general purpose programs have been bundled into a package called "GVLware".

GVLware, currently consisting of Bob, Raz and Icol, is now available via ftp. The most interesting program is probably Bob, an interactive volume renderer for the SGI. Raz streams raster images from disk to an SGI screen, enabling movies larger than memory to be played. Icol is a color map editor that works with Bob and Raz. Source and pre-built binaries for IRIX 4.0.5 are included.

To acquire GVLware, anonymous ftp to:

machine - ftp.arc.umn.edu

file   - /pub/gvl.tar.Z

To use GVLware:

mkdir gvl ; cd gvl

zcat gvl.tar.Z | tar xvf -

more README

Some Bob features:

Motif interface, SGI GL rendering

Renders 64 cubed data set in 0.1 to 1.0 seconds on a VGX

Alpha Compositing and Maximum Value rendering, in perspective

(only Maximum Value rendering on Personal Iris)

Data must be a "Brick of Bytes", on a regularly spaced grid

Animation, subvolumes, subsampling, stereo

Some Raz features:

Motif interface, SGI GL rendering

Loads files to a raw disk partition, then streams to screen

(requires an empty disk partition to be set aside)

Script interface available for movie sequences

Can stream from memory, like NCSA XImage

Some Icol features:

Motif interface

Easy to create interpolated color maps between key points

RGB, HSV and YUV color spaces, multiple file formats

Communicates changes automatically to Bob and Raz

Has been tested on SGI, Sun, DEC and Cray systems

BTW: Bob == Brick of Bytes

Icol == Interpolated Color

Raz == ? (just a name)

Please send any comments to

gvlware@ahpcrc.umn.edu

This software collection is supported by the Army Research Office

contract number DAALO3-89-C-0038 with the University of Minnesota Army

High Performance Computing Research Center.

Imaging Applications Platform is a commercial package for medical and

scientific visualization. It does volume rendering, binary surface

rendering, multiplanar reformating, image manipulation, cine sequencing,
intermixes geometry and text with images and provides measurement and
coordinate transform abilities.
It can provide hardcopy on most medical film printers, image database
functionality and interconnection to most medical (CT/MRI/etc) scanners.
It is client/server based and provides an object oriented interface. It
runs on most high performance workstations and takes full advantage of
parallelism where it is available. It is robust, efficient and
will be submitted for FDA approval for use in medical applications.
Cost: $20K for OEM developer, $10K for educational developer
and run times starting at $8900 and going down based on quantity.
The developer packages include two days training for two people in Toronto.
Available from:
ISG Technologies
6509 Airport Road
Mississauga, Ontario,
Canada, L4V-1S7
e-mail: Rod Gilchrist <rod@isgtec.com>

18. Molecular visualization stuff

[Based on a list from cristy@dupont.com < Cristy > , which asked for
systems for displaying Molecular Dynamics, MD for short]

Flex

It is a public domain package written by Michael Pique, at The Scripps
Research Institute, La Jolla, CA. Flex is stored as a compressed,
tar'ed archive (about 3.4MB) at perutz.scripps.edu [137.131.152.27], in
pub/flex. It displays molecular models and MD trajectories.

MacMolecule

(for Macintosh). I searched with Archie, and the most

promising place is sumex-aim.stanford.edu (info-mac/app, and

info-mac/art/qt for a demo)

Runs on SGI machines. Call Terry Lybrand (lybrand@milton.u.washington.edu).

XtalView

It is a crystallography package that does visualize molecules and much more.

It uses the XView toolkit.

Call Duncan McRee <dem@scripps.edu>

landman@hal.physics.wayne.edu:

I am writing my own visualization code right now. I look at MD output

(a specific format, easy to alter for the subroutine) on PC's. My

program has hooks into GKS. If your friend has access to Phigs for X

(PEX) and fortran bindings, I would be happy to share my evolving code

(free of charge). Right now it can display supercells of up to 65

atoms (easy to change), and up to 100 time steps, drawing nearest

neighbor bonds between 2 defining nn radii. It works acceptably fast

on a 10Mhz 286.

icsg0001@caesar.cs.montana.edu:

I did a project on Molecular Visualization for my Master's Thesis, using

UNIX/X11/Motif which generates a simple point and space-filling model.

KGNGRAF is part of MOTECC-91. Look on malena.crs4.it (156.148.7.12),

in pub/motecc.

motecc.info.txt Information about MOTECC-91 in plain ascii format.

motecc.info.troff Information about MOTECC-91 in troff format.

motecc.form.troff MOTECC-91 order form in troff format.

motecc.license.troff MOTECC-91 license agreement in troff format.

motecc.info.ps Information about MOTECC-91 in PostScript format.

motecc.form.ps MOTECC-91 order form in PostScript format.

motecc.license.ps MOTECC-91 license agreement in PostScript format.

ditolla@itnsg1.cineca.it:

I'm working on molecular dynamic too. A friend of mine and I have developed a program to display an MD run dynamically on Silicon Graphics. We are working to improve it, but it doesn't work under X, we are using the graphi. lib. of the Silicon Gr. because they are much faster then X. When we'll end it we'll post on the news info about where to get it with ftp. (Will be free software).

XBall V2.0

Written by David Nedde. Call daven@maxine.wpi.edu.

XMol

An X Window System program that uses OSF/Motif for the display and analysis of molecular model data. Data from several common file formats can be read and written; current formats include: Alchemy, CHEMLAB-II, Gaussian, MOLSIM, MOPAC, PDB, and MSCI's XYZ format (which has been designed for simplicity in translating to and from other formats). XMol also allows for conversion between several of these formats.

Xmol is available at ftp.msc.edu. Read pub/xmol/README for further details.

from BIOSYM Technologies Inc.

The program has been published in J. Molecular Graphics 10 (1992) 33. The program can analyze and display CHARMM, DISCOVER, YASP

and MUMOD trajectories. The program package contains also software for the generation of probe surfaces, proton affinity surfaces and molecular orbitals from an extended Huckel program.

It works on Silicon Graphics machines.

Contact Leif Laaksonen <Leif.Laaksonen@csc.fi or laaksone@csc.fi>

ns.niehs.nih.gov [157.98.8.8] : /pub - MULTI 3.0 (Multi-Process Molecular Modeling Suite)

MindTool

It runs under SunView, and requires a fortran compiler and Sun's CGI libraries. MindTool is a tool provided for the interactive graphic manipulation of molecules and atoms. Currently, up to 10,000 atoms may be input.

Available via anonymous FTP, at rani.chem.yale.edu, directory /pub/MindTool (Check with Archie for other sites if that's too far)

[I would also suggest looking at least in SGI's Applications Directory. It contains many more packages - nfotis]

19. GIS (Geographical Information Systems software)

(Geographic Resource Analysis Support System) of the US Army Construction Engineering Research Lab (CERL). It is a popular geographic and remote sensing image processing package. Many may think of GRASS as a Geographic Information System rather than an Image Processing package, although it is reported to have significant image processing capabilities.

Feature Descriptions

I use GRASS because it's public domain and can be obtained through the internet for free. GRASS runs in Unix and is written in C. The source

code can be obtained through an anonymous ftp from the Office of Grass Integration. You then compile the source code for your machine, using scripts provided with GRASS. I would recommend GRASS for someone who already has a workstation and is on a limited budget. GRASS is not very user-friendly, compared to Macintosh software." A first review of overview documentation indicates that it looks useful and has some pixel resampling functions not in other packages plus good general purpose image enhancement routines (fft). Kelly Maurice at Vexcel Corp. in Boulder, CO is a primary user of GRASS . This gentleman has used the GRASS software and developed multi-spectral (238 bands ??) volumetric rendering, full color, on Suns and Stardents. It was a really effective interface. Vexcel Corp. currently has a contract to map part of Venus and convert the Magellan radar data into contour maps. You can call them at (303) 444-0094 or email care of greg@vexcel.com 192.92.90.68

Host Configuration Requirements

If you are willing to run A/UX you could install GRASS on a Macintosh which has significant image analysis and import capabilities for satellite data. GRASS is public-domain, and can run on a high-end PC under UNIX. It is raster-based, has some image-processing capability, and can display vector data (but analysis must be done in the raster environment). I have used GRASS V.3 on a SUN workstation and found it easy to use. It is best, of course, for data that are well represented in raster (grid-cell) form.

Availability

CERL's Office of Grass Integration (OGI) maintains an ftp server: moon.cecer.army.mil (129.229.20.254).

Mail regarding this site should be addressed to

grass-ftp-admin@moon.cecer.army.mil.

This location will be the new "canonical" source for GRASS software, as well as bug fixes, contributed sources, documentation, and other files.

This FTP server also supports dynamic compression and uncompression and "tar" archiving of files. A feature attraction of the server is John Parks' GRASS tutorial. Because the manual is still in beta-test stage, John requests that people only acquire it if they are willing to review it and mail him comments/corrections. The OGI is not currently maintaining this document, so all correspondence about it should be directed to grassx@tang.uark.edu

Support

Listserv mailing lists:

grassu-list@amber.cecer.army.mil (for GRASS users; application-level questions, support concerns, miscellaneous questions, etc) Send subscribe commands to grassu-request@amber.cecer.army.mil.

grassp-list@amber.cecer.army.mil (for GRASS programmers; system-level questions and tips, tricks, and techniques of design and implementation of GRASS applications) Send subscribe commands to grassp-request@amber.cecer.army.mil.

Both lists are maintained by the Office of Grass Integration (subset of the Army Corps of Engineers Construction Engineering Research Lab in Champaign, IL). The OGI is providing the lists as a service to the community; while OGI and CERL employees will participate in the lists, we can make no claim as to content or veracity of messages that pass through the list. If you have questions, problems, or comments, send

E-mail to lists-owner@amber.cecer.army.mil and a human will respond.

Microstation Imager

Intergraph (based in Huntsville Alabama) sells a wide range of GIS software/hardware. Microstation is a base graphics package that Imager sits on top of. Imager is basically an image processing package with a heavy GIS/remote sensing flavor.

Feature Description

Basic geometry manipulations: flip, mirror, rotate, generalized affine. Rectification: Affine, 2nd, 3rd, 4th and 5th order models as well as a projective model (warp an image to a vector map or to another image). RGB to IHS and IHS to RGB conversion. Principal component analysis. Classification: K-means and isodata. Fourier Xforms: Forward, filtering and reverse. Filters: High pass, low pass, edge enhancing, median, generic. Complex Histogram/Contrast control. Layer Controller: manages up to 64 images at a time -- user can extract single bands from a 3 band image or create color images by combining various individual bands, etc. The package is designed for a remote sensing application (it can handle VERY LARGE images) and there is all kinds of other software available for GIS applications.

Host Configuration Requirements

It runs on Intergraph Workstations (a Unix machine similar to a Sun) though there were rumors (there are always rumors) that the software would be ported to PC and possibly a Sun environment.

A company called PCI, Inc., out of Richmond Hill, Ontario, Canada, makes an array of software utilities for processing, manipulation, and use of remote sensing data in eight or ten different "industry standard"

formats: LGSOWG, BSQ, LANDSAT, and a couple of others whose titles I forget. The software is available in versions for MS-DOS, Unix workstations (among them HP, Sun, and IBM), and VMS, and quite possibly other platforms by now. I use the VMS version.

The "PCI software" consists of several classes/groups/packages of utilities, grouped by function but all operating on a common "PCI database" disk file. The "Tape I/O" package is a set of utility programs which read from the various remote-sensing industry tape formats INTO, or write those formats out FROM, the "PCI database" file; this is the only package I use or know much about. Other packages can display data from the PCI database to one or another of several PCI-supported third-party color displays, output numeric or bitmap representation of image data to an attached printer, e.g. an Epson-type dot-matrix graphics printer. You might be more spe- cifically interested in the mathematical operations package: histo- gram and Fourier analysis, equalization, user-specified operations (e.g. "multiply channel 1 by 3, add channel 2, and store as channel 5"), and God only knows what all else -- there's a LOT. I don't have and don't use these, so can't say much about them; you only buy the packages your particular application/interest calls for.

Each utility is controlled by from one to eight "parameters," read from a common "parameter file" which must be (in VMS anyway) in your "default directory." Some utilities will share parameters and use the same parameter for a different purpose, so it can get a bit confusing setting up a series of operations. The standard PCI environment contains a scripting language very similar to IBM-PC BASIC, but which allows you to

automate the process of setting up parameters for a common, complicated, lengthy or difficult series of utility executions. (In VMS I can also invoke utilities independently from a DCL command procedure.) There's also an optional programming library which allows you to write compiled language programs which can interface with (read from/write to) the PCI data structures (database file, parameter file).

The PCI software is designed specifically for remote-sensing images, but requires such a level of operator expertise that, once you reach the level where you can handle r-s images, you can figure out ways to handle a few other things as well. For instance, the Tape I/O package offers a utility for reading headerless multi-band (what Adobe PhotoShop on the Macintosh calls "raw") data from tape, in a number of different "interleave" orders. This turns out to be ideal for manipulating the graphic-arts industry's "CT2T" format, would probably (I haven't tried) handle Targa, and so on. Above all, however, you HAVE TO KNOW WHAT YOU'RE DOING or you can screw up to the Nth degree and have to start over. It's worth noting that the PCI "database" file is designed to contain not only "raster" (image) data, but vectors (for overlaying map information entered via digitizing table), land-use, and all manner of other information (I observe that a remote-sensing image tape often contains all manner of information about the spectral bands, latitude, longitude, time, date, etc. of the original satellite pass; all of this can go into the PCI "database").

I _believe_ that on workstations the built-in display is used. On VAX systems OTHER than workstations PCI supports only a couple of specific third-party display systems (the name Gould/Deanza seems to come to

mind). One of MY personal workarounds was a display program which would display directly from a PCI "database" file to a Peritek VCT-Q (Q-bus 24-bit DirectColor) display subsystem. PCI software COULD be "overkill" in your case; it seems designed for the very "high end" applications/users, i.e. those for whom a Mac/PC largely doesn't suffice (although as you know the gap is getting smaller all the time). It's probably no coincidence that PCI is located in Canada, a country which does a LOT of its land/resource management via remote sensing; I believe the Canadian government uses PCI software for some of its work in these areas.

SPAM (Spectral Analysis Manager)

Back in 1985 JPL developed something called SPAM (Spectral Analysis Manager) which got a fair amount of use at the time. That was designed for Airborne Imaging Spectrometer imagery (byte data, <= 256 pixels across by <= 512 lines by <= 256 bands); a modified version has since been developed for AVIRIS (Airborne VIsual and InfraRed Imaging Spectrometer) which uses much larger images.

Spam does none of these things (rectification, classification, PC and IHS transformations, filtering, contrast enhancement, overlays).

Actually, it does limited filtering and contrast enhancement (stretching). Spam is aimed at spectral identification and clustering.

The original Spam uses X or SunView to display. The AVIRIS version may require VICAR, an executive based on TAE, and may also require a frame buffer. I can refer you to people if you're interested. PCW requires X for display.

Among the Mac GIS systems, MAP II is distributed by John Wiley.

CLRview

CLRview is a 3-dimensional visualization program designed to exploit
the real-time capabilities of Silicon Graphics IRIS computers.
This program is designed to provide a core set of tools to aid in the
visualization of information from CAD and GIS sources. It supports
the integration of many common but disperate data sources such as DXF,
TIN, DEM, Lattices, and Arc/Info Coverages among others.
CLRview can be obtained from explorer.dgp.utoronto.ca (128.100.1.129)
in the directory pub/sgi/clrview.

Contact:
Rodney Hoinkes
Head of Design Applications
Centre for Landscape Research
University of Toronto
Tel: (416) 978-7197
Email: rodney@dgp.utoronto.ca

End of Resource Listing

Nick (Nikolaos) Fotis National Technical Univ. of Athens, Greece
HOME: 16 Esperidon St., InterNet : nfotis@theseas.ntua.gr
Halandri, GR - 152 32 UUCP: mcsun!ariadne!theseas!nfotis
Athens, GREECE FAX: (+30 1) 77 84 578