

Don Lancaster's

RESOURCE BIN

number seventy five

Shattering a few virtual reality illusions.

Our usual reminder here that the *Resource Bin* is now a two-way column. You can get tech help, consultant referrals and off-the-wall networking on nearly any electronic, *tinaja* questing, personal publishing, money machine, or computer topic by calling me at (520) 428-4073 weekdays 8-5 Mountain Standard Time.

I'm now in the process of setting up my new *Guru's Lair* web site you will find at (where else?) www.tinaja.com This is the place you'll go for instant tech answers. Among the many files in our library, you will find complete reprint sets for all of the *Resource Bin* and other columns. Plus a brand new **Research InfoPack Service**.

You will get the best results if you have both *Netscape Communicator* and *Acrobat Reader 3.0* installed.

Virtual Reality Today

There is a company called *Doron* at www.doronprecision.com who are the leading purveyor for the high school driver's education auto simulators. These folks have long since branched out into delivering multi-passenger motion simms to arcades, museums, science centers, and similar venues.

These are typically a "short subway car" looking beastie up on hydraulic stilts. A dozen passengers watch high definition videos while they subject themselves to total surround sound, motion simulation, and related special effects of one kind or another.

Our local *Museum Of Discovery* has one. It's recently been reprogrammed by the incredible Leonard Wikberg III of *DigitalLight* (www.digialight.com) in Flagstaff, AZ to create a spectacular solar system tour. You'll start off by dropping through the museum floor, riding up nearby Mount Graham, and circling their VAT optical and SMT radio telescope facilities. From there, it is literally off to the moon, followed by a grand tour of the entire solar

system. Fully detailing one planet and asteroid or whatever at a time. Much of the content here is real planetary footage gotten from JPL, NASA, and elsewhere. This has been seamlessly combined with utterly amazing new computer animation.

I was commenting to Leonard how some of those fractal landscapes on Venus looked overstated to the point of being too obviously fake. But he assured me that all of his Venusian Fractals were quite real. It seems their only enhancement was his modest resolution improvement of the actual flyby footage. I'll keep the ride ending a secret, except to say that it happens rather suddenly and unexpectedly.

The term "virtual reality" can have many meanings, and it is real hard to get a grasp on what is important and what is not. It is even harder still to separate what is possible today from the absolute hype.

I'll call virtual reality the creating of an artificial environment that's used to immerse one or more individuals in a simulation task. Perhaps for design, fun, training, medicine, or profit.

The vr task might be a video game such as a flight simulator or an "if it moves, kill it" slash and hack, or some more thoughtful *Riven* like adventure. Or a real flight simulator for fighters, jumbo jets, or even spacecraft. Or a

NEXT MONTH: Don looks into some home automation products and resources.

walkthrough for a new architectural design. Or checking for any assembly interference in CAD/CAM models.

Or a tour of the town. Or dildonics. Or amusement park and arcade rides. Perhaps an *Omnimax* show. Or special effects for some movie or video. Or a realtor's catalog. Or the training for a

surgeon or an eye specialist.

Or the web itself. Which is nothing but one huge virtual reality machine. For you never really go anywhere or do anything when you surf it.

Here's a random sampling of a few virtual reality resources...

VR Publishing

This outfit seems to have a good bargain: For \$29 total, they'll offer six booklets which include a 600 entry virtual reality resource directory, a 36 pager on desktop vr, a VRML primer, their special virtual reality report, a longer *VR Infomania* book, and some virtual reality cartoons.

Their url is www.vr-publishing.com. Included is info on homebrew vr, a glossary, free vr trade show listings, and useful industry links.

Web Sites

There's gazillions of virtual reality web sites. The big problem is sorting them all out. One very useful "link to links" site is tin.ssc.plym.ac.uk/vr.html Two others include www.sense8.com/resources/online_resources.html along with www.jmbe.com/vrpage.htm

A virtual reality bibliography is in www.cms.dmu.ac.uk/~cph/VRbib.html A lengthy summary of hot vr sites is in www.itl.nist.gov/div894/ovrt/hotvr.html

An interesting glossary is online at www.cyberedge.com/home/www/4al.html

There are dozens more where these came from. Try...

groucho.gsfc.nasa.gov/eve/Links.html
www.fes.uwaterloo.ca/u/mdelfgaa/plan220/group1/links.html
www.vrworlds.com/more/vrlist.html
webster.skypoint.net/members/keh/html/vrlinks.htm
www.hitl.washington.edu/projects/knowledge_base/onthenet_list.html

The real trick lies not in finding vr info but in getting it all sorted out so that it makes some sense to you.

3-D Graphics

The center of the virtual reality universe appears to be 3-D graphics. Such graphics are created as a data base of numeric values. You'll often start with an *armature* supporting a *wire frame* that's full of triangles or polygons. Or possibly use something fancier such as *Nurbs* cubic spline surfaces. Some cubic spline basics do appear in www.tinaja.com/cubic01.html It is not at all unusual for an object to consist of many thousands, or even millions of polygons.

At rendering time, the wire frame model applies its *hidden line removal* algorithms to present only the aspect to be viewed. Surfaces are then added to the wire frame. These surfaces are then modified by adding texture and color, by using specialized lighting algorithms or by literally growing fur, grass, or hair on them.

As you might guess, humongous computing power is required for a realistic rendering. *Sun* Workstations have been the norm, but ganged high end PC's are now starting to approach their capabilities. It is not unusual to spend sixty *hours* of computing per runtime *second* of rendering.

Some Magazines

The pricey *CyberEdge Journal* seems to be a leading magazine here. There's also a \$29 yearly *Virtual Reality World*, and a \$65 *Virtual Reality Now*.

Another useful pub is that superb *Game Developer*. Plus these guys...

Alpha FX
CAD/CAM Update
Computer Aided Design
Computer Graphics World
Intelligent Systems Report
Mondo 2000
New Media
Retrograde Motion
Simulators
Telemedicine & Virtual Reality
Virtual Reality Report

More details on all these titles are in www.tinaja.com/webwb01.html

There are also scads of multimedia magazines which are heavily into 3D graphics and touch on other virtual reality topics. We looked at these back in [RESBN45.PDF](#), along with the video game tools and technique magazines of [RESBN65.PDF](#). Both of these can be found on www.tinaja.com/resbn01.html

Many of these mags can be free to qualified subscribers.

Sigraph

One premier event for pretty near everything using computer graphics is the annual *Sigraph* conference, put on by those *ACM* people, short for the *Association for Computer Machinery*.

All the show proceedings are now available separately or included in the special issue of their quarterly *SIG Computer Graphics* publication.

Books

A well annotated review of all the major virtual reality books appears as the *CyberEdge Electric Best VR Books*. Found at www.cyberedge.com/4bl.html A second useful listing is on line at www.smokefreakids.com/virtbook.htm

Some of today's top virtual reality books include...

Design of Virtual Environments
Experiments in Virtual Reality
How Virtual Reality Works
Information Sources for Virtual Reality
Possible Worlds: VR Social Dynamic
Virtual Reality Casebook
Virtual Reality Construction Kit
Virtual Reality Homebrewer's Handbook
Virtual Reality Systems

More info on these and other titles at www.tinaja.com/amlink01.html

VRML

There is this fairly new computer language that is primarily intended for virtual reality extensions of the web. This one is called *VRML* and is an acronym for *Virtual Reality Markup Language*. There's a lot of good *VRML* stuff on the web.

Some major new books on *VRML* include...

3-D Graphics and VRML 2.0
Advanced VRML Techniques
Annotated VRML 2.0 Reference Manual
Building 3D Worlds in Java and VRML
Building VRML Worlds
Creating Cool 3D Web Worlds with VRML
Creating your own VRML Web Pages
Delphi VRML for Internet Solutions
HTML, VRML, and JAVA Web Publishing
Java for 3D and VRML Worlds
Late Night VRML 2.0 with Java
Mecklemedia's Official Guide to VRML
Teach Yourself VRML 2 in 21 Days

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Tech Musings V or VI	\$24.50
Ask the Guru I or II or III	\$24.50
Hardware Hacker II, III or IV	\$24.50
Micro Cookbook I	\$19.50
PostScript Beginner Stuff	\$29.50
PostScript Show and Tell	\$29.50
Intro to PostScript Video	\$29.50
PostScript Reference II	\$34.50
PostScript Tutorial/Cookbook	\$22.50
PostScript by Example	\$32.50
Understanding PS Programming	\$29.50
PostScript: A Visual Approach	\$22.50
PostScript Program Design	\$24.50
Thinking in PostScript	\$22.50
LaserWriter Reference	\$19.50
Type 1 Font Format	\$16.50
Acrobat Reference	\$24.50
Whole works (all PostScript)	\$380.00
Technical Insider Secrets	FREE

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Box 809-NV
Tatcher, AZ 85552
(520) 428-4073

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SOME VIRTUAL REALITY RESOURCES

Alpha FX 600 Harrison St San Francisco CA 94107 (415) 358-9500	Doron Precision Sys 174 Court St Binghamton NY 13902 (607) 772-1610	Measurement & Control 2994 W Liberty Ave Pittsburgh PA 15216 (412) 343-9666	Power Transmission Des 1100 Superior Ave Cleveland OH 44114 (216) 696-7648	Sun Workstations 901 San Antonio Rd Palo Alto CA 94303 (650) 960-1300
Basic Service Am Rides PO Drawer 8150 Ruidoso NM 88355 (800) 366-3991	Game Developer 600 Harrison St San Francisco CA 94107 (415) 905-2200	Mondo 2000 PO Box 10171 Berkeley CA 94709 (510) 845-9018	Product Design & Dev Box 945 New York NY 10159 (212) 633-7300	Synergetics Box 809 Thatcher AZ 85552 (520) 428-4073
Cinefex Box 20027 Riverside CA 92516 (909) 781-1917	Grainger 2738 Fulton St Chicago IL 60612 (312) 638-0536	Motion Magazine Box 6430 Orange CA 92613 (714) 974-0200	Sensors 174 Concord St Peterborough NH 03458 (603) 924-9631	Telemedicine & VR 227 E Washington Sq Philadelphia PA 19106 (800) 777-2295
Computer Aided Design 655 Americas Ave New York NY 10010 (212) 989-5800	Hydraulics & Pneumatics 1100 Superior Ave Cleveland OH 44114 (216) 696-7000	Museum of Discovery 1651 Discovery Park Blvd Safford AZ 85546 (520) 428-8081	SIGGRAPH/ACM 1515 Broadway New York NY 10036 (212)626-0500	VR Publishing 16486 Bernardo #378 San Diego CA 92128 (619) 485-5353
Computer Graphics World 10 Tara Blvd 5th Flr Nashua NH 03062 (918) 835-3161	Intelligent Systems 2555 Cumberland #299 Atlanta GA 30339 (770) 431-0867	New Equipment Digest 1100 Superior Ave Cleveland OH 44114 (216) 696-7000	Simulators 4838 Ronson Ct San Diego CA 92111 (619) 277-3888	Virtual Reality Report 11 Ferry Ln W Westport CT 06880 (800) 632-5537
CyberEdge Journal 1 Gate 6 Rd Sausalito CA 94965 (415) 331-3343	Machine Design 1100 Superior Ave Cleveland OH 44144 (216) 696-7000	New Media 901 Mariner's Is Blvd #365 San Mateo CA 94404 (415) 573-5170	Small Parts PO Box 4650 Miami Lakes FL 33014 (305) 557-8222	Virtual Reality World 11 Ferry Ln W Westport CT 06880 (800) 632-5537
Design News 8773 S Ridgline Blvd Highlands Ranch CO 80126 (617) 558-4342	McMaster-Carr Box 54960 Los Angeles CA 90054 (213) 692-5911	PCIM 2472 Eastman Ave #33-34 Ventura CA 93003 (805) 658-0933	Stewart 2356 Main Mall Vancouver BC V6J 1Z4 (604) 822-2872	Westrex 4545 E Industrial St #5B Simi Valley CA 93063 (805) 520-2500

Using VRML
 Virtus VRML Starter Kit
 VRML & 3D on the Web for
 Dummies
 The VRML 2.0 Handbook
 VRML 2.0 Sourcebook
 VRML: Bringing Virtual Reality...
 VRML: Exploring Virtual Worlds...
 VRML: Flying through the web
 VRML Clearly Explained
 VRML Programmer's Library
 Web Publishers VRML Quick
 Reference

You can get more info on any of these at www.tinaja.com/amlink01.html
 We have also seen above that VR Publishing has a concise 32 page VRML Primer book. And you should shortly discover a [comp.lang.vrml](http://www.tinaja.com/webwb01.html) newsgroup just below.

Newsgroups

There sure are a lot of newsgroups that involve themselves with virtual reality in one way or another. A few of these include...

[alt.3d](#)
[alt.cyberspace](#)
[comp.ai](#)
[comp.ai.games](#)
[comp.ai.philosophy](#)
[comp.cad.autocad](#)
[comp.graphics.algorithms](#)

[comp.graphics.animation](#)
[comp.graphics.misc](#)
[comp.lang.vrml](#)
[comp.multimedia](#)
[comp.graphics.visualization](#)
[comp.robotics.research](#)
[rec.aviation.simulators](#)
[rec.games.video.arcade](#)
[rec.video.desktop](#)
[sci.virtual.worlds](#)
[sci.virtual.worlds.apps](#)

Mechanical Stuff

Besides *Doron*, a few of those other simulator manufacturers are *Stewart*, *Westrex*, and *Basic Service Amusement Rides*. A more complete list can be found in the above directories or via the *Thomas Register* link you'll find at www.tinaja.com/webwb01.html.

If you are interested in the actual design of simulators, rides, robots, tactile gloves, or whatever, your best starting point will often be the trade journals. As always.

Your biggies here include *Machine Design* and *Design News*. Individual bits and pieces are found in *Product Design and Development* and in *New Equipment Digest*. Also check *Design Engineering and Design Product News*.

Hydraulics and Pneumatics covers the obvious. Your robotic stuff is best

found in *Sensors*, *Power Transmission Design*, *Measurement & Control*, *PCIM*, or *Motion* magazines.

The all time greatest place for small parts is, of course, *Small Parts*. Helped along by the usual *W. W. Grainger* and *McMaster-Carr*.

Your really big thing these days in motion platforms is called the *inverted hexapod*. These newly see major use in everything from milling machines to simulators. These are just six pivoted push or pull struts whose combined motions determine the head or pod movement.

All actions are simple extensions or compressions; you will find zero side loading and nothing whatsoever that resembles a precision way or a sliding friction surface.

Finally, the special effects goodies used by the movie magic folks is a secret industry all to itself. Their little known trade journal is *Cinefex*

This Month's Contest

For our contest this month, just tell me about any virtual reality resource I may have missed out on.

Or, better yet, how about coming up with a brand new virtual reality concept, use, or application. With all of that humongous new computing

power available these days and super web access to pretty near anything, there should be all sorts of new apps you can dream up.

I still strongly feel there are all sorts of potential new vr uses for lower pressure pneumatics. Actuated with simple bladders, rolling diaphragms, or bellows. Power can be easily done with an aquarium air pump. And control can be as simple as a low cost automotive TCS or SCS three way valve. More details on such valves at <http://www.tinaja.com/barg01.html>

Another emerging new vr area involves tactile feedback. With gloves or surfaces that "push back" or let you "feel texture". Piezo microactuators might be one route here. Free samples from *Amp Piezo*.

The tactile problem lies in real time management of zillions of actuators, each of which has to be very fast responding, low in cost, and provide

an effect that is both realistic and safe.

Or, as a third contest possibility: Assume you are attending a top secret meeting at *Dildonics International* at their highest security corporate level. Discussing their current vr product liability class action suit. Send me a copy of the transcript of that meeting.

There should be a largish pile of my new *Incredible Secret Money Machine II* books going to the dozen or so better entries, plus an all-expense-paid (FOB Thatcher, AZ) *tinaja quest* for two that will go to the very best of all.

Send all your *written* entries to me here at *Synergetics*, rather than to *Nuts & Volts* editorial.

For More Help

Additional hot linked vr content is found in www.tinaja.com/resbn01.html, while vr book access links are found at www.tinaja.com/amlink01.html The vr magazine sources can be reached

through www.tinaja.com/webwb01.html. Customized and personal consulting services for vr or nearly any other technical topic are reachable by way of www.tinaja.com/info01.html ♦

Microcomputer pioneer and guru Don Lancaster is the author of 35 books and countless tech articles. Don maintains his no-charge US tech helpline found at (520) 428-4073, besides offering all of his own books, reprints, and consulting services. Don also offers a free catalog full of his unique products and resource secrets. The best calling times are 8-5 on weekdays, Mountain Standard Time.

Don is the webmaster of his Guru's Lair found at <http://www.tinaja.com>

Full reprints and preprints of all Don's columns and ongoing tech support appear here. You can reach Don at Synergetics, Box 809, Thatcher, AZ 85552. Or send any messages to his US Internet address of don@tinaja.com

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