



**V**irtual Reality is one in a long line of technologies that have left the research labs in a blaze of media interest – and then failed to live up to the public's exaggerated expectations. It is, perhaps, the most over-hyped of recent 'world-changing' technologies – with some supporters of Virtual Reality promising the public so much (a new 'virtual' frontier, even) only to appear to deliver so little.

So what happened to the promise? Surely all the media attention and government investigations had some justification? Well, yes. The technology of VR is highly innovative, but the level of media interest was probably too-much-too-soon.

This has led some to believe that VR has failed. Quite simply, the reality of VR for most people has not been able to match the media hype. When the public placed their money in the VR arcade machine they discovered that Virtual Reality did not give a hyper-real experience to rival the complexities of real life. In fact, most VR machines in the public arena would be hard-pressed to convince anybody that they were in Legoland, never mind some 'cybernetic alternate reality'! Understandably, many people felt let down and their interest faded.

Anyway, after having apparently dismissed Virtual Reality as 'last year's big thing' why am I writing about it here? Well, as the mass-media attention waned, the next phase of real

work on VR began. Today, researchers are pushing the capabilities of the technology ahead at a great pace and, are also learning to work within the technology's limitations.

A good illustration of this second point is that the old 'icons' of VR – the Head Mounted Display and DataGlove – have largely given way to a more pragmatic approach to Virtual Reality where interaction with the 'virtual world' is via more familiar devices, such as the computer screen, mouse or joystick. That's not to say HMDs and DataGloves aren't being used and improved, but they are no longer seen as the defining characteristics of a VR system.

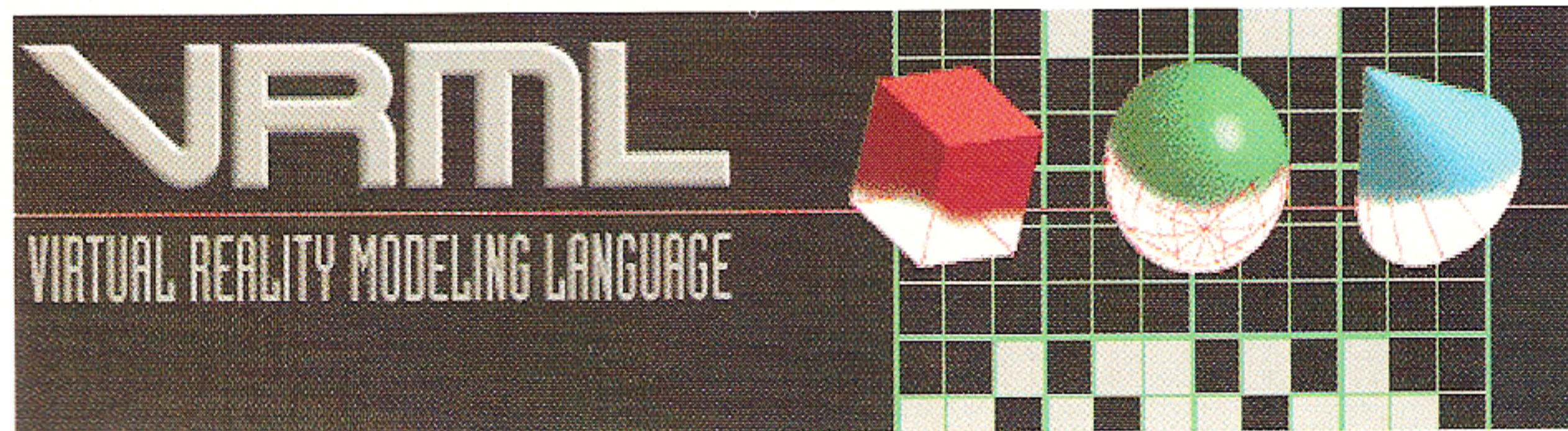
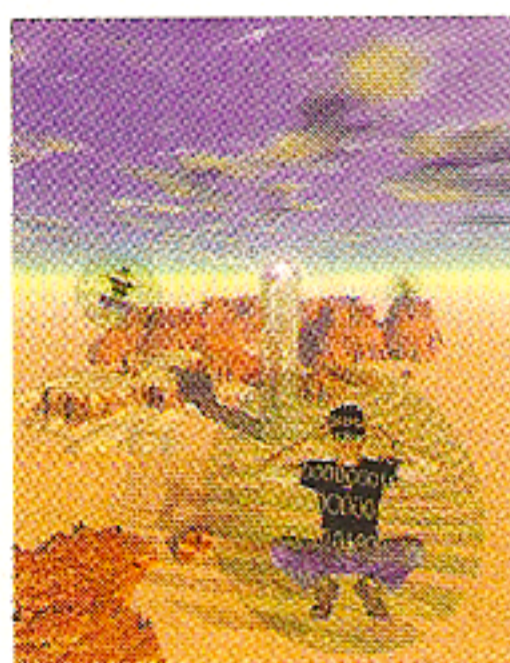
## VRML browsers could transform the Internet into a virtual three-dimensional space.

In recent years the growth of computer networking has given Virtual Reality a new exciting application area – as the future interface technology for the world's distributed communication systems. And it's this application we shall be focusing on for most of the remainder of this article. We profile VRML, the new Internet standard that promises to do for distributed three-dimensional information spaces what HTML has done for two-dimensional information spaces and we look at TurboGopherVR, a Macintosh program that allows you to visualise Gopherspace in 3-D.

We also show how Virtual Reality is being used as an artistic medium and how the Internet is helping to support the emerging community of Virtual Reality artists. Finally, we present an overview of Virtual Reality resources on the Net.

With the media spotlight pointing elsewhere, Virtual Reality is at last starting to get real.

**VRML's own Web page (see box below)**



### VRML: The future of the Net?

Over the past five years we have seen the appearance of ever more sophisticated Internet 'front-ends'. The best known of these being the various WWW browsers, from NCSA's early, ground-breaking Mosaic to the 'extended' Web browsers, such as Netscape, with

## A Guide to Virtual Reality Resources on the Net

If you are interested in Virtual Reality then the Internet is definitely the place to look for information on the latest developments in this field. You'll find a wealth of discussion groups, email lists, Web sites and software archives. And there is more good-quality VR material on the Net now than there has ever been before. To help you on your way we list some of the best resources below.

### Usenet Newsgroups

sci.virtual-worlds and sci.virtual-worlds.apps are the two moderated newsgroups for people interested in VR. They are used daily by thousands of VR researchers from around the world. The alt.cyberspace.\* hierarchy offers an 'alternative' (as you'd expect!) view of Virtual Reality with

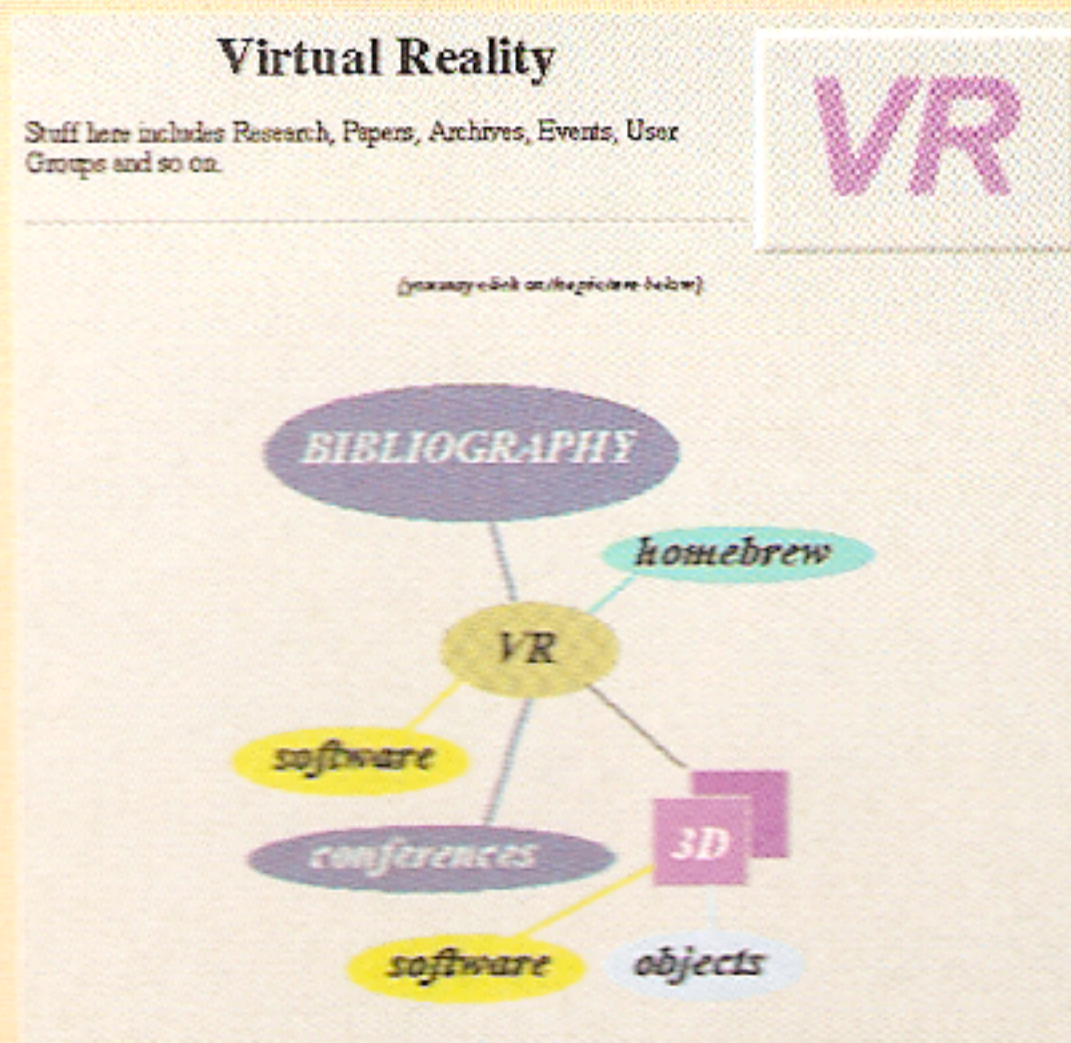
discussions of the technology and social impact of VR. Other useful groups include alt.3-d for discussion of three-dimensional visualisation techniques and comp.graphics for information and news about computer graphics.

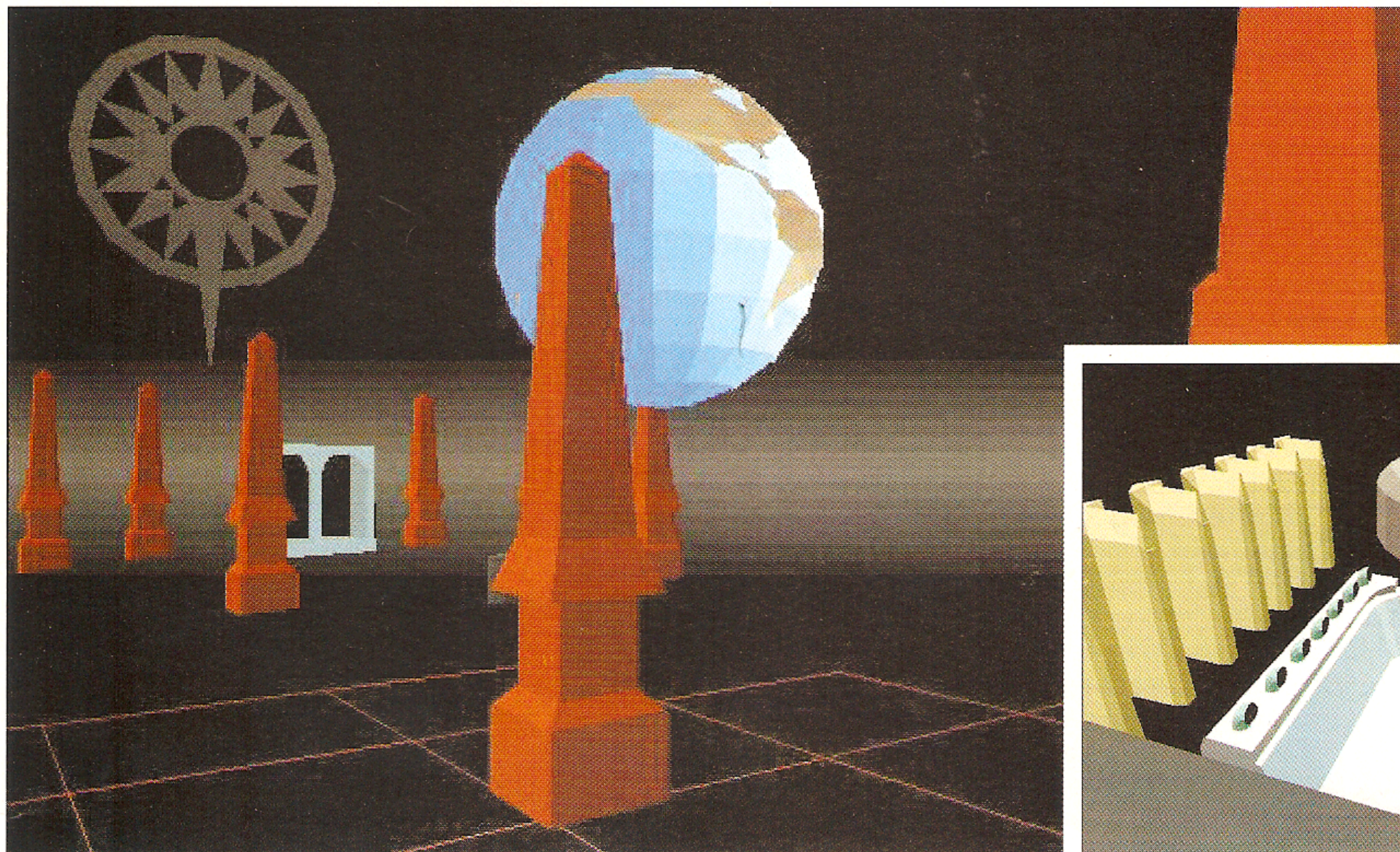
### Email lists

People in the UK may want to join the UK VR-SIG mailing list by sending the message "join ukvrsig forename surname" to mailbase@mailbase.ac.uk. Artists with an interest in VR can join the VR-ART mailing list by sending "join vr-art forename surname" to mailbase@mailbase.ac.uk. Both of these lists carry news and discussions about Virtual Reality and have their previous postings archived at the <http://www.mailbase.ac.uk/> World Wide Web site. To subscribe to the VRML discussion list send "subscribe www-vrml your-email-address" to majordomo@wired.com.

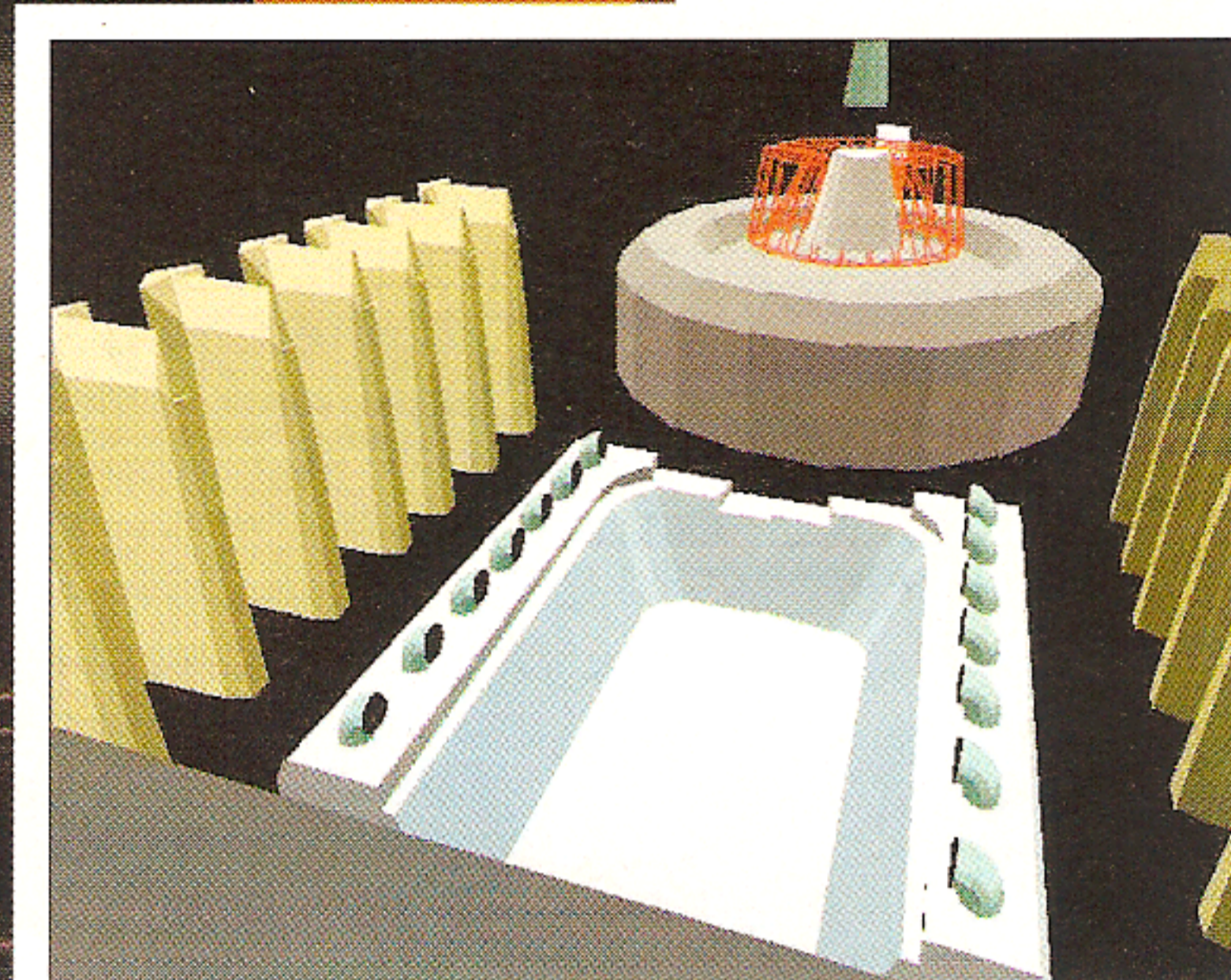
### Web sites and links to software archives

Web sites relating to Virtual Reality have grown from a few university laboratories sites less than two years ago, to the numerous commercial, entertainment and





Some examples of the artwork produced by the new generation of VRML artists.



superior formatting capabilities. In the near future we will see even more advanced Web browsers being used with the release of 'scriptable' browsers such as Sun Microsystems's Hot Java.

However, despite the increasing sophistication of these Web browsers, one thing has remained largely the same: they still present information as a collection of two-dimensional documents, or pages. What's more, when you access a Web document you are normally unaware of the other people who might currently also be using it.

This could all change with the development of Virtual Reality Modelling Language. VRML is an emerging standard that enables three-dimensional models to be defined for

viewing by multiple users via the Internet. Or in the words of Mark Pesce, a key figure in the development of VRML, "(VRML) is a language for describing multi-user interactive simulations – virtual worlds networked via the global Internet and hyperlinked within the World Wide Web."

The impact of VRML could be huge. It could transform the Internet into a three-dimensional space, viewed using a dedicated browser. Initially these browsers would display the 'virtual world' of the Internet on your computer screen, but ultimately you could be immersed in the Net using true stereoscopic devices, such as Head Mounted Displays.

If you think all of this sounds like Virtual Reality hype then you might be surprised to hear that VRML browsers are not a



research-related VR sites that are now available. Many of the best sites are in the UK – confirming our position as one of the leading developers of Virtual Reality technology.

**UK VR-SIG – the UK Virtual Reality Special Interest Group**  
<http://www.crg.cs.nott.ac.uk/ukvrsig/index.html>

**The Virtual Reality Society (VRS) – an international VR discussion forum**  
<http://web.dcs.hull.ac.uk:80/VRS/>

**Virtual Reality Art – part of the DRC Virtual Gallery**  
<http://dougal.derby.ac.uk/gallery/vr-wing.html>

**The Virtual Reality Markup Language Page – held at WIRED magazine's Web site**  
<http://vrmml.wired.com/>

**Chris Hand's VR Stuff – Chris 'Dr.Virtual' Hand's excellent collection of VR resources and information**  
<http://www.cms.dmu.ac.uk/~cph/vrstuff.html>

**Hot Virtual Reality Sites – More links to VR information**  
<http://nemo.ncsl.nist.gov/~sressler/hotvr.html>

**Jon's Virtual WWW List – even more Virtual Reality resources**

<http://www.vrasp.org/vrasp/jon/vrwww.htm>

**VR World home page – the VR magazine published by Meckler**

<http://www.mecklerweb.com:80/mags/vr/vrhome.htm>

**The Virtual Presence home page – a major UK Virtual Reality company**

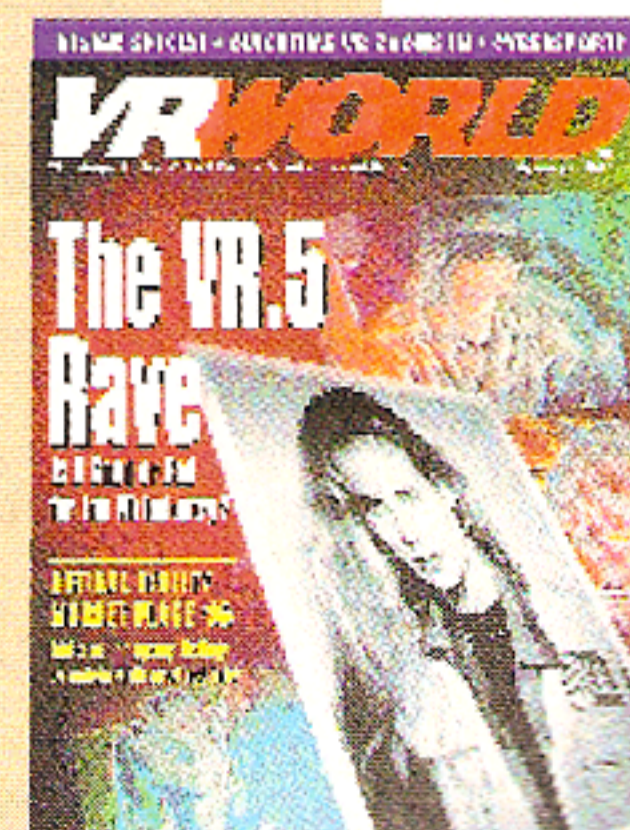
<http://www.demon.co.uk/presence/index.html>

**The Virtual World entertainment server – the makers of the Virtual Reality game BattleTech**


<http://www.virtualworld.com/>

People interested in building their own 'homebrew' Virtual Reality system might want to keep an eye out for Robin Holland's (R.Hollands@sheffield.ac.uk) forthcoming book 'The Virtual Reality Homebrewers Handbook' to be published by John Wiley & Sons later in the year.

Many thanks to Shaun Varney for helping with the research for this list of resources.

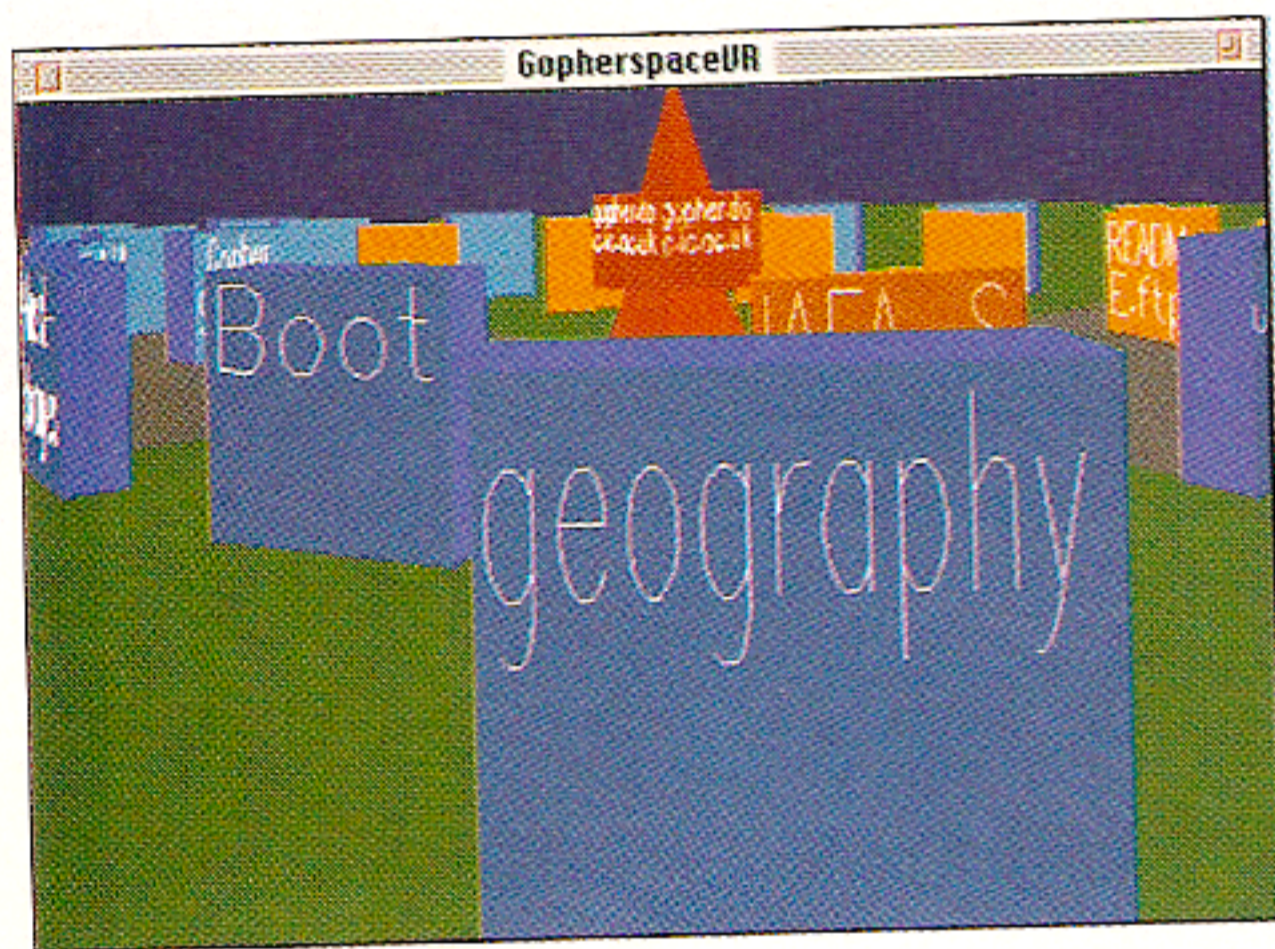




 dream but are in fact available now. The first such browser, WebSpace, runs on Silicon Graphics machines and lets you explore VRML data files as well as standard HTML documents. According to its Web site, versions of WebSpace will shortly be available for other platforms, including Windows PCs, Macs and Sun workstations. What's more, numerous other VRML browsers are in development. And if you're sceptical of the ability of VRML browsers to work within the limits of the Internet, remember VRML was designed to work over a 14.4K modem connection.

The current specification of VRML allows you to define three-dimensional models and link these models together. However, VRML 2.0, due for release later this year, will support multi-user interaction, so people can become aware of others as they explore a VRML model. Imagine being able to 'bump' into people as you explore the Net! You could 'hang out' at your favourite site, meet people, or collaborate on projects.

Details of the VRML mailing list and the WIRED VRML Web site (which also has links to other VRML sites) are given in the resource guide. The latest news of WebSpace can be found on the SGI Web site at: <http://www.sgi.com/Products/WebFORCE/WebSpace/>.



**Navigating Gopherspace with TurboGopher VR can be fun (at least for a while).**

double-click on the TurboGopherVR icon to be transported to a three-dimensional representation of Gopherspace, where documents and Gopher directories take the form of multicoloured obelisks, spiralling around a pyramid-like structure that represents your current location on the Internet.

It's great fun to play with. I especially like the 'fly-over' of the scene that you get when you link to a new Gopher site or directory. To be honest, though, the novelty does wear off after a while. However, if you do get bored you can always switch back to the 'old-fashioned' two-dimensional interface that the TurboGopherVR client also offers!

TurboGopherVR is probably the first successful attempt to render a significant part of the existing Internet as a three-dimensional space. Many people have predicted that the Net will one day become a true 'cyberspace' - navigated spatially using VR-like devices and techniques. Well, with TurboGopherVR you are getting a sneak-preview of what this might be like. It may not be a perfect realisation of William Gibson's vision, but it's here and it's now and it works!

TurboGopherVR for the PowerMac and Unix platforms can be downloaded via FTP from [boombbox.micro.umn.edu](http://boombbox.micro.umn.edu/pub/gopher/Macintosh-TurboGopher/TurboGopherVR/) in the directory: [pub/gopher/Macintosh-TurboGopher/TurboGopherVR/](http://pub/gopher/Macintosh-TurboGopher/TurboGopherVR/).

### Virtual Reality as Art

In order for any new medium to develop it has to move away from being the sole preserve of the technologist into the domain of the artist. History has many examples of this: photography, cinema, computer graphics, even the Internet. If Virtual Reality is to become established as a new medium, it needs to attract the attention of artists.

One artist who has recently begun to work with this technology is Shaun Varney ([S.E.Varney@derby.ac.uk](mailto:S.E.Varney@derby.ac.uk))



## Glossary

**Cyberspace** - A term coined by writer William Gibson to describe a fictional computer network that would be presented to its users as a three-dimensional space. The term is often used to describe the expected intersection of Virtual Reality technology and the Internet.


**Gopher** - Gopher is an Internet information system that's particularly well-suited for the storage of text-based materials. 'Gopherspace', as Gopher sites are collectively known, can be accessed via most World Wide Web clients or by using dedicated Gopher clients such as TurboGopher.

**Head Mounted Display or HMD** - A display device used to present a true stereoscopic computer-generated image to a computer user. Recent developments in display and optics technology have led to much lighter, higher-resolution, HMDs.

**Virtual Reality or VR** - The use of computer technology to create an artificial environment that has many features in common with the 'real world'. Most VR systems present their environment as a three-dimensional model that can be explored in real-time by a user. Some VR systems also offer spatial sound and the ability to 'feel' and 'hold' virtual objects via the use of special instrumented 'gloves'.

from the University of Derby. Shaun uses SuperScape's Virtual Reality Toolkit software to generate VR art works on a high-end PC. He has been using VRT for about six months and now believes that a new art form is arising as people learn to fill in the gaps between the 'ideal' virtual world we have come to expect and what's technically achievable with the technology today. As he says, "I aim to confront people's expectations of Virtual Reality and show that there is more to this medium than what we have been lead to believe."

Shaun also co-ordinates **VR-ART** (see resource guide), an email discussion list for artists who use Virtual Reality in their work. Lists such as VR-ART are helping to establish an international community of Virtual Reality artists who use the Internet to share ideas and exhibit their work.

Interestingly, Shaun has plans to convert some of his art works into the VRML format. As he says, "this will give me the opportunity to exhibit work in ways that are simply not possible in conventional galleries, with thousands of people able to explore my three-dimensional creations via their computer screens." Keep an eye on his Web site for details (see resource guide). 

## About the Author

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He is also Editor of Internet and Comms Today's sister publication, NetUser, and is a co-founder of the UK Virtual Reality Special Interest Group.