Inhabited Virtual Worlds
A New Frontier for Interaction Design

Introduction: Real Space comes to Cyberspace

In April of 1995 the Internet took a step into the third dimension with the introduction of the Virtual Reality Modeling Language (VRML) as a commercial standard. Another event that month caused fewer headlines but in retrospect was just as significant. A small company from San Francisco, Worlds Incorporated, launched WorldsChat, a three dimensional environment allowing any Internet user to don a digital costume, or avatar, and travel about and converse with other people inhabiting the space. WorldsChat was appropriately modeled on a space station complete with a central hub, hallways, sliding doors, windows, and escalators to outlying pods.
WorldsChat rapidly attracted a set of regular inhabitants and sightseers who developed a culture to suit the environment. At any time of the day or night, avatars could be seen engaged in intense chat or careening around the station discovering its passageways, rooms and secret tricks. For the first time, there was "space" in Cyberspace and "visiting a place on the Internet" began to have real meaning.

**Worlds for many Tastes**

In just the space of a year, an entire panacea of two and three dimensional inhabited graphical virtual worlds (now known simply as "worlds") has appeared on the Internet. Some of these worlds are designed to enhance the chat room experience: WorldsChat from Worlds, Inc., WorldsAway from CompuServe, V-Chat from Microsoft, ThePalace from Time-Warner Interactive, and Virtual Places from GNN and America Online. Other worlds focus on experimental development of the interactive version of VRML: PointWorld from Black Sun Interactive, Moondo from Intel, Utopia from Onlive! and many others. Another type of world has concentrated on enabling users to easily construct buildings and whole cityscapes: AlphaWorld from Worlds Inc., and the Terra Vista project. Lastly, numerous on-line multi-user gaming environments have appeared.

Visiting these worlds is easy, requiring a minimum of an Internet dial-up connection and a reasonably fast personal computer. After downloading and installing special client software, the world can be entered, usually at no charge. Some worlds run within on-line services and do not require a direct Internet connection. The majority of these environments run on Windows PCs but some are available for Macintosh or UNIX environments. The author's organization, the Contact Consortium, maintains a repository of worlds and a set of traveler's guides to these environments on its web site at http://www.ccon.org.

**Origins of Worlds**

The worlds medium is the child of mixed heritage, including:
Multi-user text chat environments such as MUDs, MOOs, IRC, chat rooms and role playing board and computer games dating from the late 1960s.

- Realistic three dimensional computer games and fast rendering engines which emerged from video arcades to give us Doom and Myst.
- Virtual reality, modeling and simulation systems

Chat is one of the most popular activities on the Internet, running a close third to electronic mail and browsing the World Wide Web. Following in the footsteps of Mosaic, worlds transform the chat experience from a text-based experience into a visual one. However, worlds have begun to evolve beyond a mere chat enhancement into a collaborative, community building environment.

**HCI for the Masses**

This new medium is exciting and the possibilities for its use seem endless. Companies are now trying to design worlds for retailing, virtual conferencing and project sharing. Educational institutions are experimenting with worlds as learning environments. In the next century, millions of people may enter worlds every day to socialize, learn, work or be entertained. The medium will be strengthened with the addition of voice, video, immersive headsets, faster scene rendering and boosted Internet data rates. The worlds medium could very well have the same impact on the Twenty First Century as the telephone, radio, film and television had on the Twentieth.

We believe that the worlds medium is the next great frontier in interaction design and research. Perhaps the best feature of the medium is that it allows, possibly for the first time, ordinary home users with standard PCs and Internet dial-up connections or on-line services to become interaction designers and participate in collaborative exercises. Participants in our organization's projects range from secondary school children in Alabama to a rabbi in Israel. HCI specialists will have to adapt to the fact that their discipline is suddenly of relevance to a large number of people. The worlds medium will challenge the HCI field to an extent inconceivable a few years ago.

**The Contact Consortium: Life in Digital Space**

The Contact Consortium was founded in March of 1995 as a non-profit research and educational forum to enrich the human experience within virtual worlds. Our membership includes individuals possessing a wide range of expertise from the social sciences, anthropology, engineering, the businesses hosting worlds, computer scientists, and HCI specialists. We also count as participants a large number of regular users of the Internet. The Consortium holds large scale experiments within these environments to evaluate their effectiveness for the world creators and to study and document this unfolding phenomenon. Like scientists entering an experimental biosphere, Consortium "cybernauts" don avatars and "live in digital space" for extended time periods.

A key mission of the Consortium is to bring the expertise of the HCI community into the worlds phenomenon. We hope that the following two stories of design and interaction in a virtual world will encourage many of you to participate in this exciting new medium of human contact.

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I. Designing a Happening in Digital Space

*the Wedding of Janka and Tomas*
On May 8, 1996 at 10:00pm Central Standard Time, a young couple, Janka and Tomas, were wed inside the AlphaWorld virtual cityscape. This was not the first on-line wedding but it was the first to be held inside a three dimensional inhabited virtual world on the Internet. Preparations for the wedding took several weeks and included:

- Design and construction of a special pavilion for the event including an open air runway, stage, backdrop and sound
- Assignment of roles for the participants
- Creation and distribution of custom avatars (bride and groom)
- A visit to the site, training and rehearsal for the event
- Sending out of invitations and coordination of event times (in global terms)

When the event was actually held, many coordinated actions from the participants were required to make it a success including:

- Wayfinding guides to take people to the pavilion
- Crowd control measures to keep the event from degenerating into unstructured chaos
- Reliance on the shared cultural background of participants who understood what a wedding ceremony should consist of
- Creating a center of focus (the minister and couple) at the pavilion stage
- Use of the tried and true rumor mill method to provide information to participants
- Apt photojournalism to capture the event for coverage by many web-based community newspapers

The stage and pavilion, designed by AlphaWorld citizen Laurel, was a work of skill, art and function. The space conveyed a bright, festive mood while being very practical for a virtual space event.
Users in avatar often prefer floating while conversing, as is seen here (the text chat is displayed over the heads of the conversants). Spaces for public events are therefore best designed as open to the sky.

The best man (Netguy) and groom (shown in black tie avatars) with the bride (in white) and bridesmaid (Yellow Rose) behind her, stand before the minister, who is positioned on the stage.

Seen in an overhead view, avatars rush in to congratulate the couple. The text from the various voices crashes together, along with the avatars themselves. It is not considered rude to pass through someone in a virtual world.
It took about 30 minutes to arrange for the couple to pose for a photo (as it would with a real-place wedding). Following the wedding, Tomas, who was in Texas, drove 3100 miles to Tacoma, Washington to be with his bride. This was perhaps the longest delayed "you may kiss the groom" in history! The event lasted approximately 3 hours. The cognitive workload of positioning oneself in a three dimensional environment while conversing and not missing essential elements of the ceremony was mentally taxing. However, Consortium participants agreed that the wedding had the trappings of the real thing. We felt like we had "been somewhere, and done something". For your interest, the URL for Janka and Tomas is: http://www.best.com/~uvi/tomjanka.

II. Designing and Living in a Virtual Village

The Sherwood Forest Towne Experiment

The Contact Consortium was conceived back in August 1994 as a forum for contact, culture and community in digital space. By January of 1996, our dreams of constructing an inhabited virtual community were about to come true. After six months of testing virtual world environments, the Consortium determined that AlphaWorld had evolved far enough to attempt a full scale community design experiment.
Our goal was to go beyond the random "build and abandon" activity characteristic of AlphaWorld and other environments and create a virtual village which would have continuous habitation. We selected an area within "walking distance" of the main landing point in AlphaWorld, known as "ground zero". This would allow us to easily guide new guests to the site, and avoid having to go through "teleports" which take citizens to distant sites.

In January 1996 we selected a site and carpeted it with a large forest, consisting of many species of trees, shrubs and flowers, all interspersed with lakes and streams. We wanted a natural setting in which to situate this new human community. Our goal was to create something aesthetically pleasing and incent builders to invest similar qualities into their constructions.
Next, we walled a large area to define the town boundaries. We chose the catchy theme of the Sherwood Forest of Robin Hood’s time. On March 24, 1996 we held a town planning meet inside the site. Participants from all over the world showed up in response to our email broadcast. We tried out a cultural interface innovation, a “talking circle” which would allow more than two avatars to carry out a conversation. New members joined the Sherwood community and many called for an unplanned area where they could build outside our “community code”.

[Figure 8: Talking Circle at the Main Gate to Sherwood Forest Towne, SHTALK1.JPG]
We had much work to do in preparation for the next event, which would be a build-in on May 4, 1996, including:

- Layout and assignment of specific building lots for qualified builders
- Creation of the Sherwood companion website, complete with town map, town charter, builder's guide and newspaper (http://www.ccon.org/events/sherwood.html)
- Reservation of a large additional unincorporated area called New Towne to permit more free form experiments
- Definition of roles and duties including mayor to arbitrate disputes, a zoning inspector to define and assign lots, a mapmaker, a town crier to promote the town and its events, a town administrator, and a town architect.
- Absolute coverage of our land to prevent attack by AlphaWorld vandals (as warned by the recently created AlphaWorld Police Department).

Let the building begin!
Starting on April 29, 1996 and right up through the build-in on May 4, lots were assigned and structures rose. On May 4, Consortium members met guests and community members in-world to help them with building and dealing with the zoning restrictions. Sherwood Town provides services such as access and easement, mailboxes (allowing neighbors to contact each other), site review, dispute resolution, a community newspaper and condemning of sites.

Steve Lankton, CoCreator in AlphaWorld and a world renowned psychotherapist, constructed a clinic for counseling, called Therapies 'R' Us, shown above. Steve was at work for eleven hours and opened Therapies for business at 10:00pm PST. We are not sure if he has had any clients yet but perhaps we will use the Therapies structure for dispute resolution!
BlackThorne (Doug Goodier), a real surfer from Brisbane, Australia and a master builder in AlphaWorld, toured new arrivals around his high TechHut and gave lessons in building and social interaction in the world. Two surfer avatars (13 year old Brian Williams and his friend from Birmingham, Alabama) were thrilled to meet Doug and showed up the next day for more building instruction.

**The Future of Sherwood**

![Figure 14: Sherwood map, SHMAPM.JPG](http://www.ccon.org/papers/interart2.html)

![Figure 15: overhead view of Sherwood Towne, AWHVV3.JPG](http://www.ccon.org/papers/interart2.html)
Our first town map and a subsequent high altitude view of part of Sherwood townsite illustrates the rapid growth of the area. We will be developing the New Towne area and including in it a school of building and social interaction. We are developing a mentoring program which will guide newcomers in the ways of social interaction, navigation and building. In addition, an architect from the United Kingdom is designing a school of virtual architecture and a rabbi from Israel and a lay minister from the US will be building sacred spaces. Additional plans call for a town hall and "pie in the sky" bakery and social gathering point. We hope to keep drawing in guests and members to revisit Sherwood Towne. Beyond Sherwood we plan an experiment called Mark I Asteroid. We hope to implement this in VRML as an exercise in digital space design and habitation outside the familiar metaphors of streets and houses.

A Panacea of Worlds

AlphaWorld is only one of many virtual world environments hosted on the Internet. Virtual Reality Modeling Language (VRML) has evolved considerably in the past two years, recently acquiring advanced interactive facilities. Four VRML environments enabling habitation of avatars have come on-line in 1996: PointWorld from Black Sun Interactive, Moondo from Intel Corporation, Utopia from OnLive! and a world from Oz Interactive. In addition, several distributed VRML community building projects, such as Terra Vista, are in process. VRML worlds require users to build using a separate modeling system, as contrasted with the in-world building of AlphaWorld. VRML, however, allows users to define any shape or scene, as opposed to AlphaWorld's fixed set of textured objects. We expect that the realism and ease of use of the AlphaWorld environment will be adopted in the VRML environments.

On a different tangent altogether, two dimensional graphical chat worlds continue to evolve on their own path. Environments such as: the Palace from Time-Warner Interactive, Virtual Places from GNN and America Online, WorldsAway from Fujitsu Cultural Technologies and CompuServe, V-Chat from Microsoft and others are redefining the chat room experience. These environments are much more accessible to the average computer user, not requiring a knack for three dimensional navigation. Interface designers have been busy innovating in these environments: some offer simple emotional cues (a palette of happy and sad faces), some enable custom avatars for every user and some even offer tours of the web, with postage stamp avatars hugging a virtual rocketship.

All of these worlds are described in detail and linked into the Consortium website at: http://www.ccon.org.

A New Frontier for Interaction Design

In our expeditions into multi-user virtual worlds we have discovered that there is plenty of new ground to be explored by the interaction designer and the entire CHI community. Some of the new issues raised by the experiences described above include:

- New designs to support individual social interactions and group events need to be developed and their effectiveness studied.
- The interface designer will find that ordinary users of virtual worlds can be co-designers and engage in participative design.
- The design of spaces in virtual worlds affects the level and style of social interaction (for example, the effectiveness of wedding pavilion). Further empirical studies are needed to understand the relationships and find the way to a set of methodologies for inhabited virtual space design.
- Methods for shared community construction, communication and collaboration are needed.
Effective cultural interfaces are another design challenge.
Designing the embodiment of people in the world, including body language, gesture, voice and facial expression is an important task lying ahead.
Telling time and finding your way in a world requires some new interface innovations.
Many existing tools and methods could be useful in the new world: the ethnographic interview, user-centered design and cognitive walkthroughs.
Effective definition and acting out of roles is an essential design element inside a world.

Invitation: It is your world

We invite you to explore this medium with us. We will be hosting numerous in-world experiments and real-place conferences over the next several years and presenting results at ACM CHI and other conferences. Please feel free to visit our website at http://www.ccon.org or contact the author directly via our webmaster.

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End.

TELEPORT!
Teleport to the Wedding Pavilion at 5755.4N 5564.5E in AlphaWorld!

Go to Papers Index

Back to Consortium Home Page

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