“SPECIAL TREATMENT”
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BY
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in collaboration with Applied Interactives.

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I. Applied Interactives

The genesis of "Special Treatment" began in the fall of 2001 with the beginnings of Applied Interactives. My participation in ***EVL: Alive on the Grid***[i] at the ARS Electronica festival with two separate projects – ***syn.aesthetic***[ii] a tele-collaborative sound piece, and ***Home***[iii] for which I was the primary technical assistant – had solidified a desire to pursue immersive and interactive artworks. In addition, I began building a prototype passive stereo system for the Design Visualization Laboratory and the Art and Architecture department as part of the establishment of a new virtual reality (v.r.) lab area for the upcoming remodeling of the Arts & Architecture building. Excited with the possibilities of the v.r. medium and gathering the knowledge of more practical virtual reality systems, I began talking to other Electronic Visualization Laboratory (EVL) students about forming a collaborative group to marshal our resources and skills in the pursuit of artwork and research in the this new area of more affordable virtual reality systems, as outlined in "A Low-Cost Projection Based Virtual Reality Display."[1] In early 2002, the Center for Art and Technology at Northwestern University contacted me about building such a system in the Katz Gallery of the Block museum. The three individuals that I had approached about forming the group (eventually called Applied Interactives), Todd Margolis, Keith Miller and Tim Portlock first worked together on building this system for Northwestern.

After completing the construction of the Northwestern system, long discussion resulted in a consensus to form a non-profit group to popularize v.r. as a medium by taking the work and systems out of basement labs to gallery and museum settings[iv]. We also believed that it was important not to function as technologists who produced art, but as purveyors of and educators about v.r., who explain the technology of v.r. and speak of its possibilities to a larger artistic community in the hopes of helping other artists to develop and exhibit their own v.r. endeavors. Our first opportunity to show as Applied

1 "A Low-Cost Projection Based Virtual Reality Display", D. Pape, J. Anstey, G. Dawe, SPIE 2002, Available at http://www.evl.uic.edu/pape/papers/lowcost.spie02/

Interactives occurred in February of 2001 for the ***Who?*** festival in Indianapolis. In a few weeks, we constructed a simple tracked, passive stereo system composed of components borrowed from EVL, and created Linux versions of our respective pieces from the ***EVL: Alive on the Grid***[v] show which we called ***Shared Spaces***[vi]. We learned a difficult lesson about showing in these new settings when we found our installation of ***Shared Spaces*** less than 20 feet from a megaphoned circus sideshow and below a large neon work called "Beers and Boobs." Participation in the ***version >02*** conference at the Museum of Contemporary Art-Chicago soon followed and we continued to exhibit the suite throughout the rest of the year at the ***Symposium on Art, Technology & Spirituality*** at Northwestern University as well as the (art)[n] gallery. Hopefully, the documentation of the development of Applied Interactives and "Special Treatment" can provide a useful discussion of many of the problems and solutions to conceptualizing, directing, and implementing future large collaborative efforts.

II. Special Treatment

1. Collaboration

"Special Treatment" came into being in the fall of 2002 when our exhibits made a positive impression on Ellen Sandor of (art)[n]. While our cooperative had learned to work together over the preceding six months, the lack of our own space, as well as our own equipment for day to day use, had hindered our ability to develop new work as an independent group. To secure this equipment and space Applied Interactives entered into a collaborative agreement with (art)[n] to establish a workspace and install a VR Portal[vii] system[**fig. 1**] with a permanent home in the (art)[n]

gallery. The agreement was to develop a piece to recreate the space and mood of a PHSCologram entitled "Barracks"[fig. 2] in a virtual environment using our system and tools. The "Barracks" had a considerable amount of post-processing, and it was render as a very impressionistic photograph of the interior of a barracks from the camp at Birkenau – Auschwitz II. It evoked a feeling of blurred, half-remembered space with a dreamlike quality apparent in the light.

The initial goal of creating an environment that would duplicate the look and feel of the PHSCologram, while providing real-time point of view was changed when early attempts to prototype the blurring and lighting effects in a real-time application like yg[viii] created a less than convincing effect. Early research materials from the Państwowe Muzeum Auschwitz-Birkenau w Oświęcimiu [The Auschwitz-Birkenau State Museum] had provided us with the plans and photographs necessary to construct accurate models of the barracks interior and exterior. However, the rendering of real-time effects to approximate the photographic processing of the PHSCologram did not function well on a passive stereo system. Applied Interactives began looking at other methods to invoke the same feeling of the unearthly barracks of the PHSCologram – experimentation with environmental characteristics and sound design then began to create a space which evoked the same strong sense of memory as the original.

2. Concept

This examination of memory was to become the most important in the conceptual development of "Special Treatment," and it began the move from a strictly visual interpretation of the piece toward two more specific goals: to expand upon the narrative implementations

found in earlier pieces examining historic or cultural heritage themes, and to provide a richer experience through the development of a visual style and behaviors which take greater advantage of the increased capabilities of the graphics and processing power of these systems. Additionally, the subject matter upon which the piece was situated meant that creating a work that spoke to the subject of memory, and not solely to historic acts of genocide and the Holocaust, would be a more inclusive approach. Approximately one year of discussion and research, prototyping and argument was needed to reach the artist's statement of "Special Treatment"[ix], which describes an environment constructed to evoke new memories in those whose only experience with that history was the secondhand recreation and retelling of those events. In a fragmented camp based on details of the camp at Auschwitz-Birkenau**[fig. 3]**, fictionalized memories of the camp exist invisibly in a bleak and largely barren landscape. As an individual enters one of these trigger memories, all marked by iconic white figures, that memory takes shape around them becoming more solid while dialogue, ambient sounds, and props that comprised that memory also take on corporeal form. When the user leaves that memory, the memory begins to fade again into the ether**[fig. 4]**, a progression representative of the importance of actively remembering and considering extra-personal events. Additionally, each visitor is invited to leave their own memory in the environment, represented by a stone of remembrance, which will replay their recorded message when picked up. As these stones begin to accumulate, new visitors will become aware of the multitude of opinions and memories relating to these historical events. They will form their own active memories, which are constructed from not only the experience of the past, but the thoughts and interpretations of those who have experienced that history in the present.

3. Challenges

Experience with other cultural heritages and historic pieces such as ***Virtual Harlem***[2] and ***Shared Miletus***[3] helped to define technical and compositional solutions to the challenges of virtual reconstructions from real places at other times. The primary challenges come from constructing scenes based on historic sources (plans, photographs, descriptions) and their implementation in real-time graphic environments. The reconstruction of physical architectural spaces creates large empty areas where the photographic details of historic artifacts rarely match the detail of the environment (terrain, flora, horizon). In addition, these large spaces create challenges to an immersed participant's ability to navigate long distances in a short amount of time, while also touching on historical points of interest rather than the spaces in between. Also, while great attention can be focused on visual recreation of an environment, auditory recreation of that same environment is frequently given much less development time. Finally, the establishment of guided tour models, the initial entrance into the environment, training in how to navigate and use the controller, and annotated explanations of points of interest can conflict with and prevent a consistent level of immersion desired for the participants.

4. Decisions

The primary challenge of creating a more cohesively immersive environment was addressed in a number of different ways. As the central concept of memory came to the forefront, a

2 **Virtual Harlem, Virtual Heritage at iGrid 2000**, Pape, D., Anstey, J., Carter, B., Leigh, J., Roussou, M., Portlock, T., Proceedings of INET 2001, Stockholm, Sweden, June 2001. URL: http://www.evl.uic.edu/cavern/papers/igrid-heritage2001.pdf

3 **Shared Miletus: Towards a Networked Virtual History Museum**, D. Pape, Anstey, J., D'Souza, S., DeFanti, T., Roussou, M., Gaitatzes, A., Proceedings of the International Conference on Augmented, Virtual Environments and Three-Dimensional Imaging (ICAV3D), Mykonos, Greece 05/30/2001 – 06/01/2001. URL: http://www.evl.uic.edu/papers/pdf/miletus-icav3d.pdf

decision was made to keep the piece an individual experience, ruling out technical developments that would require maintaining the ability of the application to be tele-collaborative. The contemplative state necessary for evoking memory can be found by a single user, who is free to reflect on his or her experiences and others memories without intrusion from other individuals or spaces. Additionally, an approach which mirrored the fragmentary and piecemeal nature of memory also meant that the Birkenau camp environment, historically crowded with individuals, and even today full of visitors, did not need to be populated visually with crowds. Plans to populate "Special Treatment" with crowds of semi-intelligent agents, as discussed in "Real-Time Shadows for Animated Crowds in Virtual Cities,"[4] were replaced by simpler figures caught in the midst of some simple action as markers for the missing crowds. The task of filling the camp with a crowd was left to the far easier implementation of both ambient and memory specific sound environments throughout the landscape.

While access to photographs and plans meant that the environment could be recreated with reasonably accurate historical artifacts, all elements were modeled and textured to provide just a shading of reality, maintaining enough presence as virtual objects to recreate the spaces of the camp without being so well formed that they contrasted sharply with the environment. Similarly, the terrain, flora, and sky, as well as the lighting and fog of the virtual environment were designed to be smoothly controlled in order to suggest similarly subtle shadings, maintaining a cohesive feel between the general environment and the highlighted elements of "Special Treatment." To finalize the construction of the environment, attention was paid to creating a broad expanse outside the main areas of interest: increasingly rugged terrain, a horizon of trees

4 **Real-Time Shadows for Animated Crowds in Virtual Cities**, Loscos, C., Techhia, F., Chrysanthou, Y., Proceedings of ACM Virtual Reality Software & Technology 2001. URL: http://www.cs.ucl.ac.uk/staff/y.chrysanthou/crowds/VRST01/LoscosVRST.pdf

placed randomly and at ground height in the distance, a shifting sonic environment providing a comfortable backdrop against which the virtual camp could exist. The challenge of managing reasonable autonomous navigation, as well as less intrusive means of guided navigation, was addressed with the development of extended navigators and control nodes in yg[x]. To provide an autonomous experience for the user, their movement through the camp was smoothly adjusted to let them traverse large spaces without hindering their ability to investigate any location. To handle roaming users, behavioral nodes constituted of navigational control and auditory feedback smoothly moved the user to or from the desired location.

Few virtual reality applications make more that a cursory attempt to introduce the user into the virtual space, foregoing gradual preparation for the jarring effect of finding oneself suddenly transported to a new environment equipped with the various controllers and devices of v.r. technology. "Special Treatment" was designed to extend upon the prompts embedded in the narrative utilized in **The Thing Growing**[5] by integrating the entire training routine into a similarly structured sequence of the narrative. Additionally, to implement a gentle path to immersion in "Special Treatment" the entire scripting for the piece, the application and narrative, was designed to be repeated; it was capable of being smoothly reset and restarted each time the story arc concluded. The narrative arc was designed to begin in an emotionally evocative idle state, not a static instructional texture or antechamber, but an active section of the environment that was understandable whether a user was equipped and starting the piece, or whether the piece was sitting unattended. This was also an attempt to address the necessity of having a physical

5 **The Thing Growing: Autonomous Characters in Virtual Reality Interactive Fiction,** J. Anstey, Pape, D., Sandin, D., Proceedings of IEEE Virtual Reality 2000, New Brunswick, NJ 03/18/2000 – 03/22/2000. URL: http://www.evl.uic.edu/pape/papers/thing.vr00/

guide or expert navigator whose presence either adversely affected the immersion of the primary user or functioned almost completely as a proxy for that user.

The trade off in creating an environment where no intelligent agent (real or virtual) will be provides feedback about where to go, what to do, or explain the goals of the experience, is that those elements must be incorporated into the work itself. "Special Treatment" implements this by constructing a familiar narrative arc, both impressionistic and completely immersive without requiring user control except for real world movement. The narrative then moves to a more autonomous setting, a door opening, where the participant's confusion is mimicked in the environment. Instructions and prompts are suggested in context to train them in the use of the controls to establish the awareness of their setting. At this point the participant is instructed to enter the greater environment where largely autonomous actions can take place. Finally, upon reaching the end of the narrative arc, either through the passing of time or a specific action of closure, the user is moved to one of a number of exit narratives built from cinematic effect and dramatic monologue.

In order to improve upon the pre-prepared annotations included in **Virtual Harlem** and less than fully realized implementations of persistence attempted in some works in **EVL: Alive on the Grid**, it was decided that "Special Treatment" would require the development of an interface to a MySQL database in order to provide a persistent record of state for the memory objects that each participant is invited to leave in the camp environment. Rather than provide elaborate icons giving faces and forms to these memories, each recording is represented by a contextually explained small stone used as a marker. By making these memories common and ubiquitous, the greater goals of the piece are made apparent and do not not serve as distractions from the carefully crafted environment. In addition, the maintenance of each memory's state in the

environment means that the actions of each user are truly persistent – whether recorded earlier that day or the previous year.

III. Project Development

1. Organization

Implementing a complex environment with many elements required a closely coordinated working arrangement for the consistent development of lighting and environmental effects, the models and textures, node creation, yg scripting, audio recording and processing. In addition, creating a a piece of v.r. artwork for exhibition also required substantial research, fiction writing, documentation skills in video and other 2d mediums, sound manipulation, funds and services solicitation, carpentry and electronics skills, and the involvement of many friends and colleagues. While a project this large necessarily required many contributors, the success of the project depended upon all efforts combining in a cohesive whole not necessarily a photo-realistic one but one which would function as a well defined space for the senses and intellect. A primary solution to the difficulty of many artists and developers working on a complex scene was addressed through the use of a CVS[xi] repository. This provided the opportunity for everyone working on the project to work in the safety of their own 'sandbox', while also allowing the combination of improvements and additions to the scene by every developer. Another way in which the goals, timelines and tasks were managed was through the establishment of a project Wiki[xii] which provided a central repository for all the ideas, plans, lists, and discussion points defined throughout the course of the project's two year development. Initially established in the early phases of the project, the Wiki continues to be used as the project is being fixed and

improved for better functionality. The Wiki also provided a much needed reference point for the development of the project as new contributors, interns, collaborators, and members were brought into the project. Information and past discussions recorded on the Wiki allowed new collaborators to 'get up to speed' without an excessive amount of time being spent on person-to-person training. The addition of new collaborators was a necessity for “Special Treatment” because even though the project still involved most of its original creators and many solutions had been found for the project's challenges, the piece was large enough that it could not have been completed without the ability to assign well defined tasks to various skilled collaborators.

For instance, early decisions about the visual style of the piece as a desaturated environment suggesting the bleakness of life at the camp, along with the exporting processes recorded in the Wiki, allowed visual development of “Special Treatment” to proceed at a rapid pace. Many elements such as the figures, props, and even some architecture were easily passed to new collaborators without the need for major stylistic oversight. Additionally, the prototypes and tests conducted in the first year of project development meant that established methods and practices existed to create new models that would function with a great degree of certainty and maintain known behaviors when faded from transparency to opacity, scaled, or repositioned. In a similar fashion, the development of new yg nodes and a scripting syntax to handle a large environment was simplified by the Wiki's outlines of decisions about how to implement dialogue and ambient sounds, user interaction, and the behavior of memory environments. By defining a development path toward each of these goals, new nodes or scripting elements could be created by a single individual to specifications agreed to by the developers at weekly meetings, each step providing an implementation which would be adequate until a better, or final, one was devised.

2. Technologies

New technologies developed for “Special Treatment” included new navigator classes to provide acceleration and velocity control for the user, direct manipulation of the user's position in the context of the environment, and feedback to the user as a means of behavioral and roaming control. New scripts in MEL Script (Maya), Perl and yg were designed to create the rich terrain and landscape, duplicating the yg scene and object placement from a simplified but parallel version in Maya. A modified sound server and yg nodes were quickly created to simplify the separation of amplitude management for scripted ambient sounds and dialogue, providing greater control of the respective amplitude levels to avoid clipping in the sound rich environment. Scripted elements in yg were developed over the course of several months to control fog, lighting, and transparency. They were finally standardized a month before the show, but still allowed the group to rapidly implement many new memory areas in the piece in the time remaining.

3. Example

One example of the many people that could be involved in only one part of “Special Treatment's” development was the implementation of the fences. A key component for defining the expanse and uniformity of the camp, the original fences created a serious slow down in the frame rate of the piece, and exhibited distracting moiré patterns when the barbed wire of the fences was viewed from a distance. Initial models of the fences were implemented by Keith Miller, and placed in the scene by me. Upon running the still uncomplicated yg scene, the overall frame rate was slowed because of polygon counts and textures in the numerous fence post

wires and lights. The models were then re-implemented by Keith Miller in a number of test versions -- one where the wire and post geometry had been simplified, and another where the wires replaced their texturing with a similarly shaded material property. Another short-lived prototype represented the wires as textured planes with an alpha channel; however, already existent problems with transparency sorting in an environment where most objects could be at less than full opacity made that solution too risky. As the scene grew in complexity, the weight of the fence models again became prohibitive. The models were again simplified/reduced, and the wires removed completely and replaced by a yg node designed by Todd Margolis to provide a real-time level of detail geometry generation for the fence wires. Finally, I replaced the initial test span of fence with the new fence geometry and rewrote the yg node to provide a more plausible range of wiring, scripted triggers, and control nodes for each of 15 spans of fence. This created navigational barriers and provided an electrified sound effect that he had created by processing sounds collected by the sound technician Hyunjoo Oh.

4. Timeline

The short timeline for accomplishing the thesis show meant that approximately 50% of the project was completed in approximately a month and a half. Prioritization and the coordination of tasks for the two months before the show required weekly meetings/work sessions of 6+ people, with many smaller meetings and discussions via email to stay within the parameters of our various timelines. Additionally, the involvement of voice talent and volunteers meant that the time to schedule recording sessions, prepare audio recordings, and rehearse scripts needed to be planned weeks in advance to have the sound files ready for scripting. Whereas the methods to

implement the persistence of memories, cinematic transitions, and user guidance were completed about a month before the show, finalization of a script and the translation and recording of the script in both German and English were still continuing into the final two weeks before the show, and became the main barrier to completion of new memory scenarios. The late acquisition of many sounds was especially problematic in that sound placement and scripting in a v.r. environment is a time intensive task prone to repeated refinement. The most arduous task in the final weeks became the integration of these many audio files into the scene, a difficult task with such limited time available. The date of the event also meant that likely audiences -- art and technology students from area universities -- were on break . Designing, printing and the distribution of postcards and posters happened at the end of December 2004, although email announcement of the event occurred earlier. Although the print materials were a little too late for a strong response, press coverage and attendance at the event was good, with many new faces at the opening.

IV. Event

1. Installation

"Special Treatment" was shown in its entirety on January 7th and January 8th, 2005 in the Applied Interactives space at the (art)ⁿ gallery in Chicago, Illinois[fig. 5]. The Applied Interactives VR Portal installation occupies the western wall of the (art)ⁿ gallery located in the G2 building at 847 W. Jackson on the Sixth Floor. The VR Portal[fig. 6] is a passive stereo system utilizing two InFocus 530 DLP projectors with circularly polarized filters that are hand mounted in the

Applied Interactives office for rear projection. A 5x7 'Disney Black' polarization preserving rear projection screen is mounted in the gallery wall approximately two feet from the floor at a 15 foot distance from the projectors. A hand-constructed SpacePad[xiii] antenna, mounted on clear Plexiglas and hung at a 60 degree angle one foot in front of and above the screen provides tracking for head sensor and Wanda™ controller without being visually distracting in the low light conditions needed for the display of the piece. The software driving the system[fig. 7] runs on three PCs: a display machine which runs yg utilizing the CAVELib™, SGI OpenGL Performer[xiv] and trackd[xv]; a tracking and sound PC with an installed SpacePad, trackd server and custom bergen sound server; and a web and sound server running another instance of bergen is also located in the room behind the mounted screen. Two speakers embedded in hidden wall alcoves, a subwoofer, amplifier and mixer, as well as wireless earphones provide spatialized audio for the piece. The wireless headphones were used specifically for the opening event when crowd noise made the audibility of the sometimes subtle sound environment difficult. In more controlled viewing situations, earphones should not be necessary, but the set of four wireless headphones[fig. 8] were an experimental attempt at dealing with crown noise while providing a shared auditory experience without adding egregiously to the equipment load already necessitated by the current wired tracking systems.

2. Opening

On the night of the 7th, approximately 130 people attended the four hour opening.[fig. 9] "Special Treatment" had been made the Featured Opening in the Chicago Reader; and a review in the online edition of New City, although providing an erroneous description of the piece, also

garnered attention. Some ill-advised last minute changes to the scene delayed the opening by 30 minutes and caused some instability in the application throughout the first hour of the show. A reversion to an earlier version of the scene from that same day traded some improvements for stability and the piece ran unattended without problems for the next three hours. On the following day, 7 different groups made half hour appointments throughout the afternoon to view the piece in a more leisurely manner, and changes to the piece rectified the previous nights instabilities so that it again was able to run unattended for 6 hours.

3. Results

The primary goals of "Special Treatment" were 1) the construction of an immersive non-linear narrative using cinematic devices to move the participant into and out of full immersion, 2) the incorporation of control interface training into the narrative, 3) the creation of a visual environment consistent in physicality, visually cohesion (though not photo-realistic), and 4) the implementation of elements of persistence which allowed the piece to exhibit our concepts of the changing continuity of memory.

We attempted to construct an experientially immersive experience by creating related story areas with similar behavior and functionality that required considerable scripting of different fictionalized voices and multiple recordings by a handful of voice actors. The bulk of each narrative subject was delivered by disembodied voices when in the memory spaces of "Special Treatment." While the memory environments become more substantial when in the act of 'replaying' memories, the narrative voices become less clear, layered and fragmented with English overlaying German overlaying ambient sounds comprised of indistinct voices and other

sounds. Without an appropriately detailed sound design this approach failed to create an understandable narrative environment composed out of fragments. Without distinct figures or icons to link with these voices, the scripted voices meant for narrative construction either overrode the visual environment or clashed with each other, causing an unbalanced focus on the audio as the user would tried to make sense of what they heard but could not see. The compromise solution of evenly mixing all sounds into a less comprehensible babble allowed the participants to pull out what they could in reference to the visual environment. This caused less of a clash between the media, but failed to provide a narrative.

More successful was the creation of an automated narrative arc which provided a gradual entrance into the virtual environment of the camp, a rich experience during the participant's self-directed exploration of the camp, and an exit from the piece consistent with the previous narrative elements but leading to a more cinematic ending. The beginning of the narrative arc was an 'idle' state, where the environment depicted a claustrophobic ride in a noisy train car to an unknown destination. The lack of clear instruction about how to initiate the narrative sequence left many users perplexed. Some method of addressing this instruction, whether through the voice of another character on the train explaining how to trigger the start, or a more intelligent monitoring of the state of the tracking equipment will be needed for future presentations.

The integration of instructions about how to function in the virtual environment, or the training section of the narrative experience, was more successful. At the end of the train ride the user is thrust into the camp with the opening of the car door. This similarity to the physical entrance into a virtual world (the user equipping with new controls, learning and following new rules), is turned into a method for explaining and providing practice with the standard controls and rules of a virtual environment for those users who are not familiar with them. After being

confined to the train car, with no ability to control unfolding events, the train car door opens in a flash of white light and the user is asked to step out of the car. An experienced user will know what to do and will probably comply. However, if the user is a novice and fails to move, the demands to leave the train car increase in intensity, instructing them in the voice of camp guard that to move they need to point their controller-hand forward, while simultaneously pushing forward on the controller. The following sections direct the user to steer and navigate through the environment and eventually use one of the buttons on the controller to let go of their suitcase. While maintaining the contextual requirements of this part of the story by using the commanding voices of camp guards, the user is trained in how to use the controller by the same voices of the guards establishing the narrative setting. After the processing/training takes place, the user is instructed to pass through a gap in the fence and begin their exploration of the memory areas of the camp. Despite having dialogue, models, and ambient sounds for 9 different memories, only 5 were implemented by the time of the show. A greater breadth of experience will be possible when these remaining memory areas are placed in the environment. The remaining element of the arc was conceptualized as a total of four distinct exits from the camp; an escape, a rescue, and two mortal endings set in the burial pits and the crematorium. The only exit implemented at the time of the exhibition was the escape exit. While a single exit, in this case a selection of monologues about escaping from the camp, served passably during a two-day showing, repeated showings would require the implementation of at least one more exit. Transitions between the scripted narrative sequences of the train car ride and exits were accomplished through the use of cinematic fade to black and white to provide well understood bridges between the different environments and settings.

Visual style was agreed upon in the earliest visual development of the piece and was maintained through the separation of tasks to keep the style consistent. Keith Miller oversaw modeling and texturing of architectural elements, and I developed a look and feel for the flora and terrain along with environmental textures (sky and lighting) for the general environment as well as specific memory transitions. One difficulty in the development of the entirety of the environment was the creation of a space, that while smaller than the actual camp, represented a very large space for a human sized participant to traverse or see across. While successful in creating a 'world' sized space without definite boundaries, the resulting spread of memories and architecture in the camp made exploration difficult over the short time (approximately 10 minutes) accorded a participant in a single experience of the camp.

The final goal of "Special Treatment" was to provide an environment populated by memories, represented by the solidity of their respective elements and the frequency of active visitors, as well as the impact of populating the landscape with the contributed memories of previous visitors left in the form of stones. The primary characteristic of the fictionalized memories, their visual strength as represented by their degree of transparency, was implemented technically but not to its best effect due to the two-day showing of the piece. This element of the piece was meant to have an effect while it was exhibited over the course of of a greater number of contiguous days to actively represent the weight of other's visits to the environment. While development of technologies to provide the needed persistence of memories, both as iconic stones and recordings was close to completion, the lack of a full implementation of the instructional audio and visual controls needed to implement this part of the concept were kept out of the show to present a clean experience. To realize "Special Treatment" completely the

development of persistence memories and stones as described in the artist's statement must occur.

V. Conclusion

Like many v.r. artworks “Special Treatment” may never be completed, because as software it is always possible that it will be rewritten, debugged, and upgraded. As an event, the 2005 exhibition of this complex work culminated in artwork that could only exist as the result of collaboration between a substantial number of artists and technologists. Even though the technologies to exhibit and produce v.r. continue to be more affordable and easier to use, these same people will no doubt continue to push those capabilities with new works. With continued development “Special Treatment” could become a permanent installation in a cultural heritage museum, such as the Holocaust Museum in Washington, D.C. or the Spertus Institute in Chicago, Illinois. Representatives of such an institution have been shown the piece and expressed interest in its goals, but the technology and its requirements are still perceived as prohibitive. Additionally, the sensitive nature of its subject matter adds an additional burden to finding venues to exhibit the work. The development of “Special Treatment” will continue and its progress can be tracked at www.appliedinteractives.com/stp/.

FIGURES

Figure 1. ***VR Portal*** *at the applied interactives space @ (art)^n gallery, 2004.*

Figure 2. ***Barracks (black and white processed)****, 1997. Stephanie Barish, Survivors of the Shoah Visual History Foundation, Ellen Sandor, Stephan Meyers, Janine Fron, (art)n.*

FIGURES

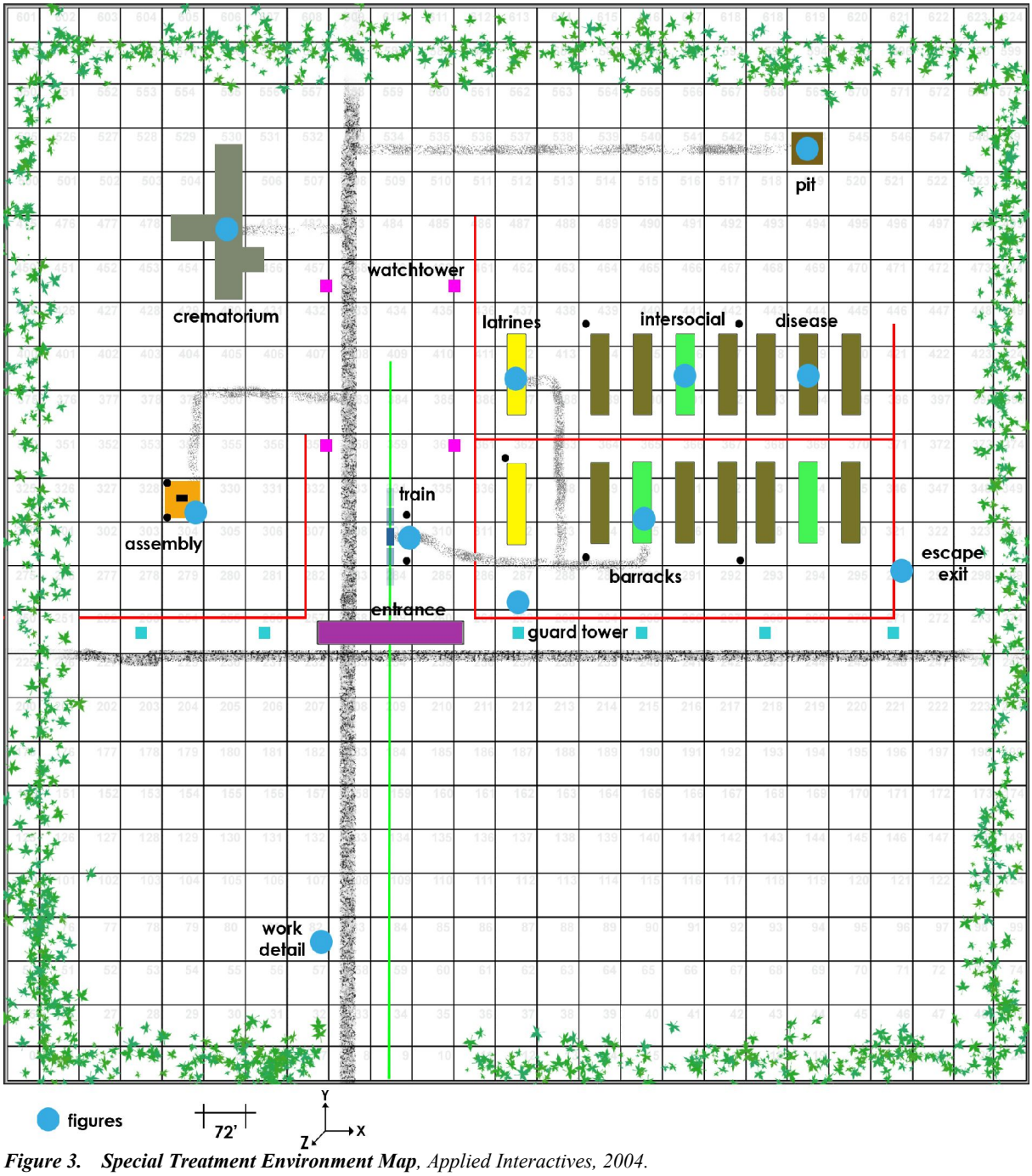

***Figure 3. Special Treatment Environment Map**, Applied Interactives, 2004.*

FIGURES

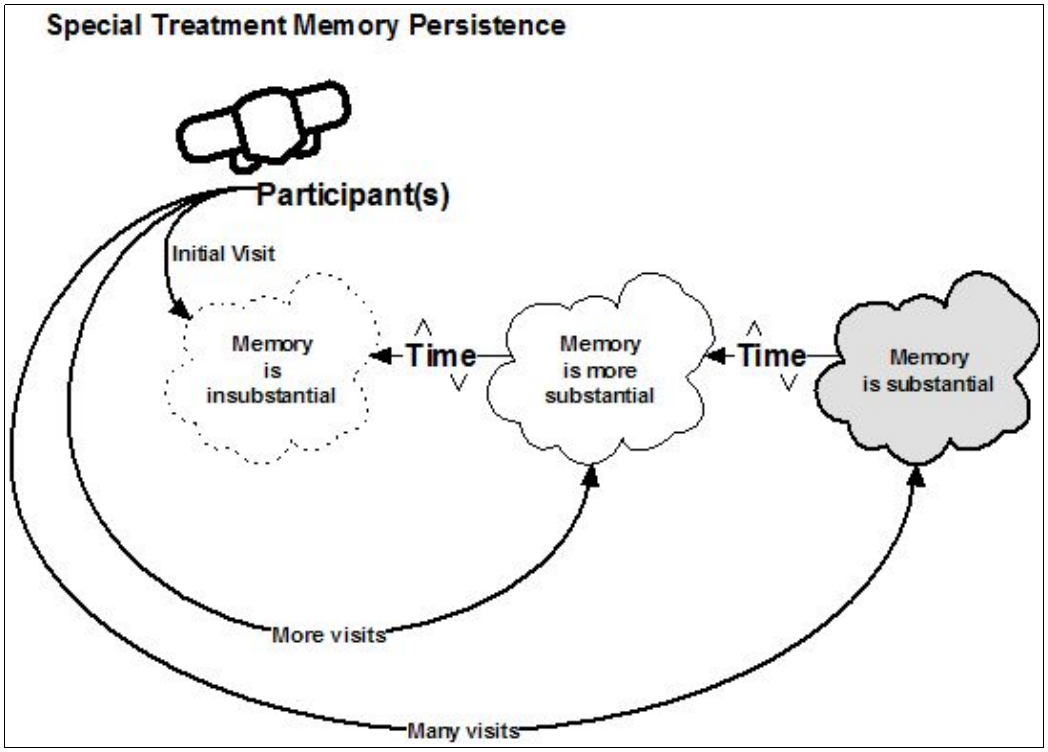

Figure 4. ***Special Treatment Memory Persistence Diagram***, *Applied Interactives, 2004.*

Figure 5. ***MFA Exhibition Postcard***, *2004.*

FIGURES

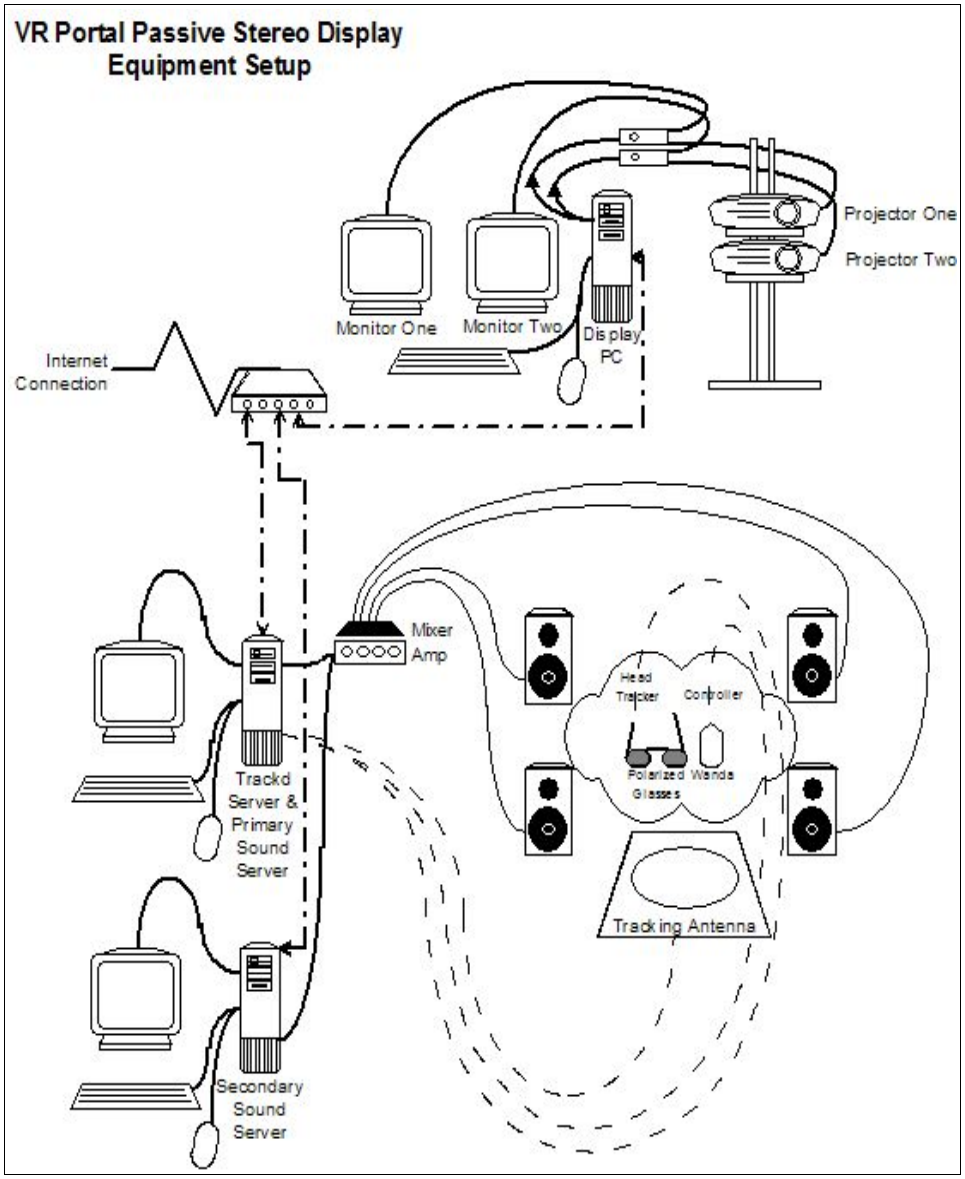

***Figure 6**. VR Portal Passive Stereo Equipment Diagram, 2005.*

FIGURES

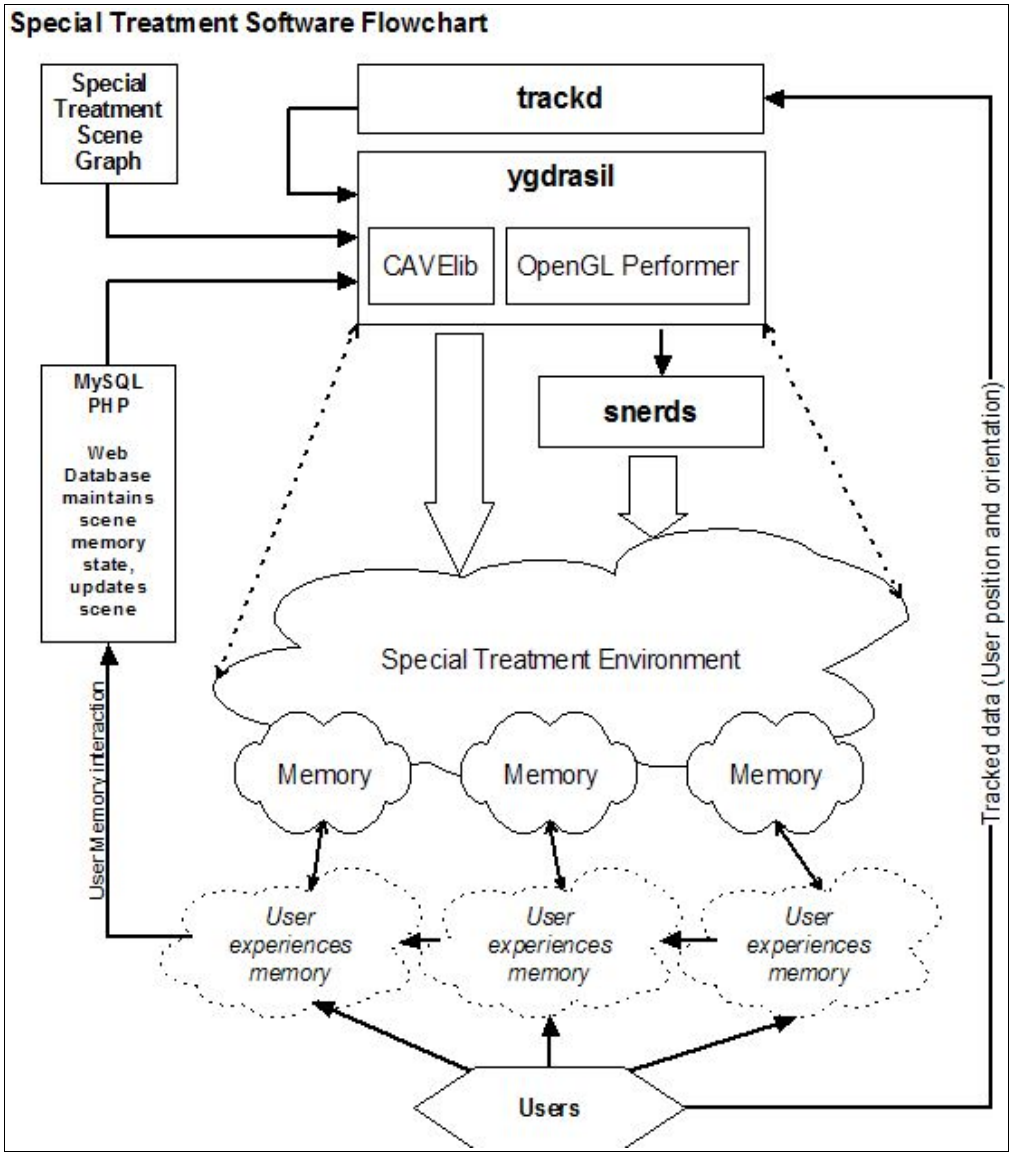

***Figure 7. Special Treatment Software Flowchart**, 2004.*

FIGURES

Figure 8. *Wireless Headphones to provide a better audio experience, 2005.*

Figure 9*. Opening Night, 7:15pm., 2005.*

FIGURES

Figure 10. *Committee Review on Saturday, 1/8/05.*

Figure 11. *Explaining how to start the narrative sequence, i.e. the expert navigator, 2005.*

ENDNOTES

(i) **EVL: Alive On The Grid**, D. Sandin, J. Anstey, G. Baum, D. Browning, B. Cerny, M. Dolinsky, P. Gemeinboeck, A. Hill, Y. L. Lin, J. Lipuma, B. Lopez, T. Margolis, K. Miller, D. Pape, T. Portlock, J. Tremonti, A. Barbier, D. Neveu.
URL: http://www.evl.uic.edu/research/res_project.php3?indi=209

(ii) **syn.aesthetic**, G. Baum, K. Miller,
URL: http://www.evl.uic.edu/research/res_project.php3?indi=205 and http://www.evl.uic.edu/events/eve_project.php3?indi=166

(iii) **Home**, D. Browning, A. Barbier, URL: http://www.evl.uic.edu/research/res_project.php3?indi=202

(iv) **Applied Interactives Mission Statement**
The purpose of Applied Interactives, NFP is to educate the art and science community about the medium of Virtual Reality as an interactive, computer-generated, immersive computer graphics environment. Applied Interactives, NFP plans to advance the medium through research and experimentation as well as provide a bridge to bring the technology out of institutional labs and into more publicly accessible arenas. Applied Interactives, NFP intends to propagate the medium by providing support and direct access to the resources necessary for artists and scientists to exhibit and develop works in the medium.
See also http://www.appliedinteractives.com/Us.html

(v) The 3 pieces comprising Shared Spaces are **syn.aesthetic** (G. Baum, K. Miller), **Infinite Studio** (T. Margolis), **Super Spectacular** (T. Portlock) and were original components of **EVL: Alive On The Grid**.

(vi) **Shared Spaces**, G. Baum, T. Margolis, K.Miller, T. Portlock,
URL: http://www.evl.uic.edu/research/res_project.php3?indi=229 and http://www.evl.uic.edu/todd/versionfest/

(vii) **VR Portal** is defined by Applied Interactives as a tracked passive stereo system (C-WALL), using a rear-projection screen which is designed to fit in to gallery and museum settings, rather than existing solely in a lab environment. Designed for each specific installation, a VR Portal forgoes a technology ANAGRAM, for treating the technology as the tool not the installation.
See http://www.appliedinteractives.com/Research.html for examples.

(viii) **yg**, (formerly Ygdrasil) is a framework developed by Dave Pape as a tool for creating networked virtual environments. It is focused on building the behaviors of virtual objects from re-usable components, and on sharing the state of an environment through a distributed scene graph mechanism. It is presently being used in the construction of several artistic and educational applications. yg is built in C++, around SGI's IRIS Performer visual simulation toolkit and the CAVERNsoft G2 library. CAVERNsoft is a C++ toolkit for building collaborative networked applications or logistical networking applications.

(ix) **Special Treatment Artists Statement**

Special Treatment advances the audience from passive viewing to active experience by smoothly moving from present to past and back again. *Special Treatment* creates a landscape where glimpses and fragments of Birkenau establish a narrative framework where the events of the past continue to shape and be shaped by contemporary interpretations of those events. The full history and lesson of a place such as the death camp at Birkenau is seen not only in the records of those who survived or passed on their memories to us in the present, but in how those events are remembered and shaped by the people of today. The stories of these people grow with each new experience of *Special Treatment*, and the solidity of that space and the substance of those events becomes more concrete with each new visitor. The immersive experience allows each participant to inhabit the scene of these events, and as they leave the evidence of their own actions and memories, *Special Treatment* is continually transformed into a new potential memory.

At its most basic level, memory is a perceived arrangement of events. Applied Interactives is concerned with how memory is a malleable substance, and *Special Treatment's* poignancy is highlighted by a world where global and mass communications instantaneously influence impressions of events, so that people have incomplete or greatly divergent ideas about the same occurrences. Even if we tried to faithfully recreate the past, the interpretation of those events would vary from one day to the next because of this elasticity of memory.

Although *Special Treatment* uses the holocaust as a context, the project creates an experience beyond time by focusing on the larger issues of persistence and memory. Events other than the holocaust could have been used as the basis for *Special Treatment.* However, any occurrence that exhibits the tragedy of 'history repeating itself' provides a powerful framework for taking a critical look at how and what people remember, how they change their thoughts over time and how cultural biases influence personal recollection.

Not a “virtual reality” but an interpreted reality, Applied Interactives has specifically selected our medium to fully engross participants in the experience by allowing them to create their own personal narrative. *Special Treatment* is more than observation - the piece is interactive as well as reactive; visceral and emotional as well as intellectual. The term virtual reality, as a cliché of futurist propaganda, has been overstated by the media and is widely considered to be an attainable technology. We are critical of this belief and the entertainment industry's portrayal of interactive storytelling. We find that they more commonly wish to construct their stories with products and brands rather than use the medium in the creation of a meaningful experience. Other mediums are bound to formulaic standards that utilize obvious narrative arcs, which don't allow for the same degree of individual ownership of the experience. With *Special Treatment* we hope to break down the conceptual barriers that have been placed around artwork employing these cutting-edge technologies.

(x) **aiCAVENavigator:** provides real-time acceleration based on user velocity and adjustable thresholds, plus the ability to turn acceleration off and on (Baum, G.)**, aiGRABNavigator:** classed from aiCAVENavigator provides an implementation of the grabNavigator with alterations to provide for real-time intersection testing while the Navigator node is under the control of another node (Baum, G., Margolis, T.)**, aiSTPNavigator**: classed from aiGRABNavigator provides real-time navigational control through simple directional and strength messages to move the user in a smooth and random fashion, while providing trigger events.

ENDNOTES

(xi) **CVS** is the Concurrent Versions System, the dominant open-source network-transparent version control system. CVS is useful because ts client-server access method lets developers access the latest code from anywhere there's an Internet connection, its unreserved check-out model to version control avoids artificial conflicts common with the exclusive check-out models, its client tools are available on most platforms. A version control system keeps a history of the changes made to a set of files. For a developer, that means being able to keep track of all the changes you've made to a program during the entire time you've been developing it. A version control system gives you a safety net. Version control systems are usually used by software development teams. Developers working on a team need to be able to coordinate their individual changes and a central version control system allows that.

(xii) A **Wiki** is a collaboratively-edited website which many people also view as an anarchistic publishing tool. The distinguishing feature of wikis is that they typically allow **all** users to edit *any* page, with full freedom to edit, change and delete the work of previous authors. Other typical wiki features include a simple set of text formatting rules which allow access to a subset of HTML, the easy creation of links to wiki pages either by joining capitalized words or surrounding them with special characters, the easy creation of new wiki pages, and a recent changes page which lists pages that have been edited recently. The oldest public wiki (the [Portland Pattern Repository]) was created in 1995, and remains active as of early 2004.

(xiii) A **SpacePad** is a low-cost, six degrees-of-freedom tracker with a flat transmitter for ease of use and placement manufactured by Ascension Tech. Applied Interactives SpacePad is on loan from EVL. URL: http://www.ascension-tech.com/products/spacepad.php.

(xiv) **OpenGL Performer™** is a powerful and comprehensive programming interface for developers creating real-time visual simulation and other performance-oriented 3D graphics applications. OpenGL Performer is built atop the industry standard OpenGL® graphics library and, includes both ANSI C and C++ bindings. It forms the foundation of a powerful suite of tools and features for creating applications on all Silicon Graphics® systems running IRIX® 6.5 or later, 32-bit Intel® based systems with Linux®, 64-bit Intel® Itanium® 2 based systems with Linux, and 32-bit Intel based systems with Microsoft® Windows® 2000 or Windows® XP.

(xv) **trackd** is a small "daemon" application that takes information from a variety of tracking and input devices and makes that information available for other applications to use, and is used by all VRCO products, including VRScape® and vGeo™, and all CAVELib™ applications. Trackd works with a variety of operating systems (IRIX, Linux, HP-UX, Solaris, and Win32) and its networking capabilities allow different graphics machines to share information from tracking and input devices regardless of operating system. Applied Interactives licenses for the CAVELib and trackd are donated by VRCO through EVL. URL: http://www.vrco.com/trackd/Overviewtrackd.html.