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# Digital Domains:

The understanding and making of a "place" in cyberspace

**Daniel J. Brick**

Bachelor of Architecture  
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June, 1993

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE  
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
**MASTER OF SCIENCE IN ARCHITECTURE STUDIES** AT THE  
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JUNE 1997

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May 9, 1997

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Dean, School of Architecture and Planning  
Thesis Advisor

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**Accepted by** Roy Strickland  
Chairman,  
Chairman, Department Committee on Graduate Studies

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The following are the readers for my thesis

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**Thesis Reader**

Takehiko Nagakura  
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**Thesis Reader**

Kent Larson  
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*Digital Domains•Brick*

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### Abstract:

The information age has provided exciting challenges for designers and users to interact and work in virtual environments. This has resulted in new interpretations to the representation of places as they begin to develop, interact and communicate their ideas in this medium. Can designers shape the many *sites* that are beginning to form and can the sites serve as *places* for interaction/communication linked only through this virtual world? How can designers react to such a landscape? Can we begin to create this environment so that an effective communication between the environment and user can take place? How should this environment be represented to the user? Finally, can we begin to "experience" the virtual artifact in a way that is flexible enough in its representation to allow for simultaneous communication of the physical space and the perceptual representation of that place. These will be some of the main issues addressed in the thesis.

My investigation seeks to develop a virtual interface for communication of an architectural artifact, that designers can use as a representation to assist them in contextualizing their understanding of that place and to facilitate an environment that aids in communicating within a virtual setting? The artifact created are the virtual design spaces here at MIT and the site for the project will be the World Wide Web.

The thesis addresses three main issues. The first will discuss navigating through the artifact. The second issue will endeavor to coalesce the fragmented views of representation through a simulation. The third will explore supplementing current representations into a experiential model to better understand the spaces and the ideas that generated them.

Thesis Supervisor: William J. Mitchell  
Title: Dean, School of Architecture  
and Planning

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# Acknowledgments

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First and foremost, I would like to thank my family for the love and support all these years. I know that without you my dreams might not have been possible.

To my advisor, William Mitchell, thank you for your support and confidence in me, you truly helped me through this experience.

To my friend/college Mark Sich, with whom I learned a great deal working with these past two years and was always there for me.

To Susan Yee, who would always put me back on track

To Amir Amir, for your mentorship and confidence in my abilities

To everyone I have met here at MIT. You all enriched my life and made these past two years a truly rewarding experience

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# Chapter 1

## GENERAL Discourse

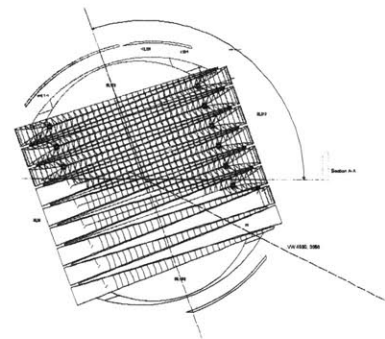
*Communication through a Virtual Environment*

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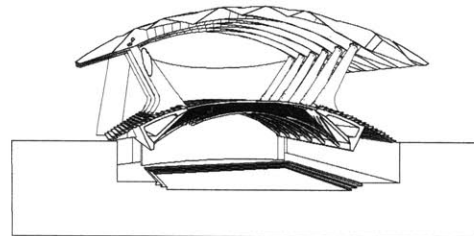
### 1.01 BACKGROUND

When we think about interacting with or within any media, we must ask, what tools are at our disposal to help best communicate those ideas and how should we go about constructing that environment. Historically, designers have developed many tools for communicating the spaces they envision. These have come to be known as traditional forms of representation known as plan drawings, **Figure 1.0**, a section drawing to show the spatial dimensions at a particular moment in a building, **Figure 2.0** and a scaled model to coalesce all of the fragmented views to a holistic understanding of the idea and the proposed built form **Figure 3.0**. There are many other techniques for representing an object or space, such as perspective drawings, axonometric, isometric, and all have been developed to help us better understand what the final building might become.

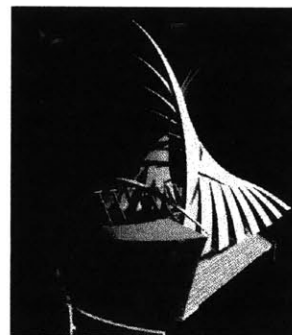
When we use the digital domain for the creation and representation of architecture, what are the appropriate forms of representation? How should we incorporate traditional methods of representation? If a section drawing can contain a very finite episode of our experience and reading of a place then, how should we incorporate and interpret a representation such as an animation through our building or a quicktimeVR node? Should we simply use them because they can be created by a digital model very easily or can they be used to represent a specific experience? Digital examples such as animations, quicktimeVR, VRML, isometric projections, realistic renderings are all rich in opportunities to abstract and express the places we want to



(figure 1.0) Plan of Santiago Calatrava's Praviillian  
courtesy of Mark J. Sich



(figure 2.0) Section of Santiago Calatrava's Praviillian  
courtesy of Mark J. Sich

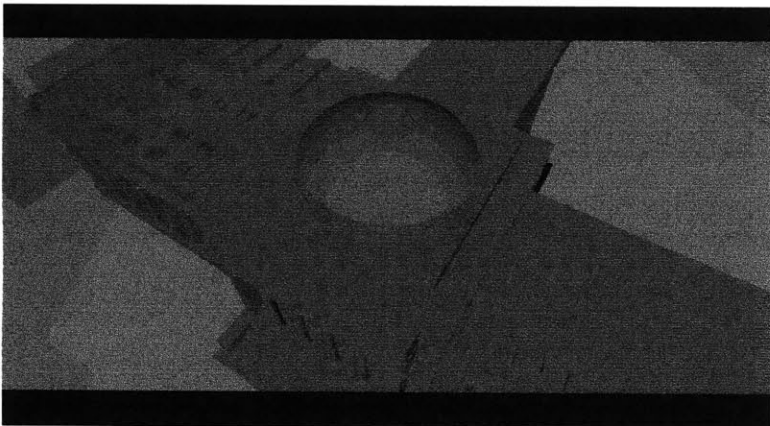


(figure 3.0) Model of Santiago Calatrava's Praviillian  
courtesy of Mark J. Sich



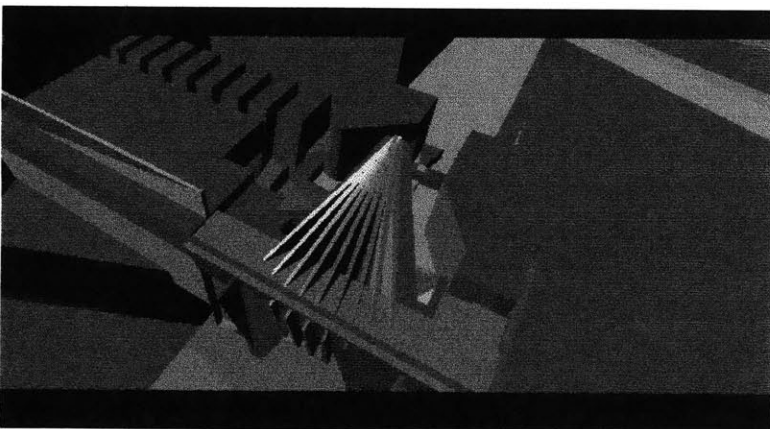
*Navigational Window used in the Thesis interface*

**NAVIGATION MODE**



*Screen capture of VRML Simulation Model*

**SIMULATION MODE**



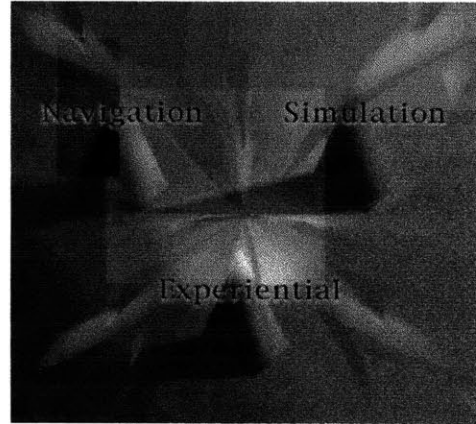
*Screen capture of VRML Experiential Model*

**EXPERIENTIAL MODE**



interact with and explore. However, these methods of representation can only be accomplished through a digital media. How should we then use these abstractions to enhance our understanding and interaction through these places? Can we build on these abstractions to become a place in and of itself --a digital domain?

To create such an interface in the digital environment, the thesis explored three issues when attempting to build a working digital environment. The diagram in **Figure 4.0** attempts to graphically represent these issues and the next three sections will discuss them in more detail.



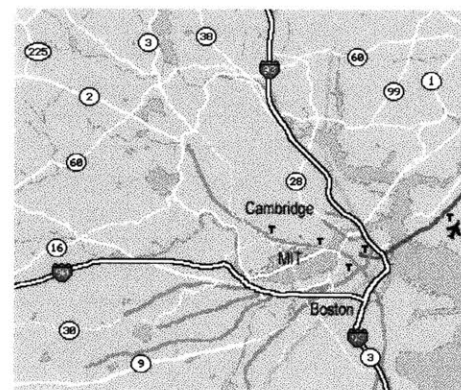
(figure 4.0) Conceptual Diagram for the Thesis

### 1.02 THE NAVIGATION EQUATION:

The first issue is the method of navigation. How do we navigate, move through a virtual environment? In our daily physical lives we navigate through the world of architecture via a set of nodes/places/districts that have been designed by architects, urban planners and vernacular designers. We have developed a sophisticated set of abstractions to aid in this experience. An example of this is the area map of Cambridge and its surrounding tributary relationships in **Figures 5.0 & 6.0**. This example displays a graphical overhead projection of the city of Cambridge and its relationship to the MIT campus. Kevin Lynch, in *The Image Of The City* depicts this relationship



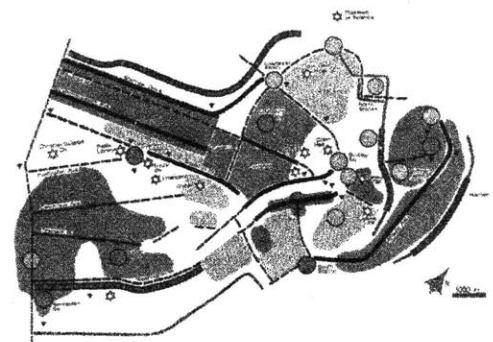
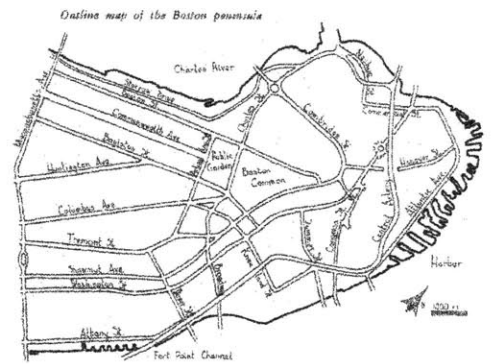
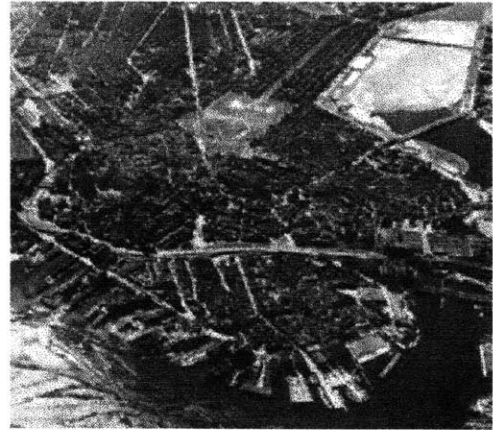
(figure 5.0) Map of Cambridge and MIT Location



(figure 6.0) Map of Boston and MIT Location

of how we come to understand the its form by identifying it into distinct districts. **Figure 7.0** is taken from this book. Cambridge and the surrounding landmarks such as the river or major roadways help to clarify our relationship of the MIT campus and surrounding area. As Lynch states, the graphical depiction of the city sets up the relationships needed to comprehend where we are and how we might get from one place to another. It also serves as a conceptual place marker for location of events that we may wish to return to in the future.

When we move, however, to the digital landscape, these types of representations are not inherently present for us to easily with which we interact and identify. Our recognition of an architecture/place have not yet been realized since the landscape of the digital domain has not been written. I raise this issue because just as we use the digital landscape to represent our ideas, we are simultaneously building its domain. So while trying to create in this virtual environment, we are also at the same time designing that environment or possible modes of interaction or representation in that environment. Therefore, we need to look at what forms of representation can be used to help build an architectural artifact in the virtual environment. The digital domain has no road maps to “map” but we can use the physical setting to help create an abstraction which will result in its own representation. Later I will discuss how this was accomplished using the domain that I created.



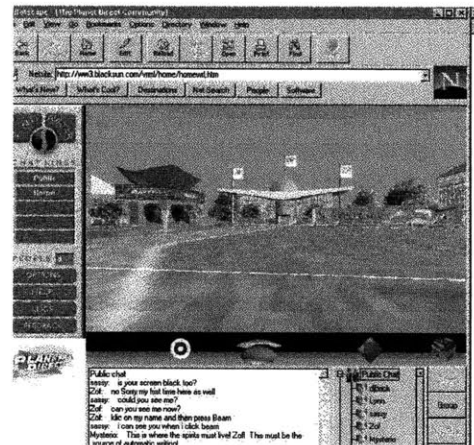
	PATH	EDGE	NODE	DISTRICT	LANDMARK
over 75% frequency					
50-75%					
25-50%					
12 1/2 - 25%					

(figure 7.0) Kevin Lynch 's Boston District Analysis

### 1.<sup>03</sup> THE SIMULATION EQUATION

The art of simulation can be explored via many different avenues; I explored the idea that this would provide a link to our understanding and experience among different forms of representations. Most successful representations are if they communicate their intended objective. In the map for the City of Cambridge, the plan shows how a diagram is used to acquire vital information which facilitates our comprehension of the city and its overall spatial configuration. Therefore, when we explore the digital domain, architecture is a good example to draw upon to create digital environments and relate them to our physical world. The result can be the creation of digital domains. **Figure 8.0** shows a current example of a virtual domain consisting only of architectural icons. This methodology for constructing these worlds has the potential to be successful because the user comes to the environment with an existing knowledge of what is being shown and how one might interact in such an environment.

The thesis builds upon this example by providing the user with representations that are familiar to them and ones that relate to a known physical environment, **Figure 9.0**. The result can then be contrasted with new forms or methods of representing the artifact. I choose to represent the design spaces here at MIT in a way that would not only take advantage of using the digital media, but also to exploit its opportunities in representation. This provided a backbone of imagery about the spaces from which one could build off of and create a digital domain. In addition, the physicality of the spaces would serve as a benchmark for testing its relationship of accuracy between the physical and virtual worlds. Further examples of this relationship will be discussed later in the thesis.



(figure 8.0) Screen shot of A virtual world on the WWW

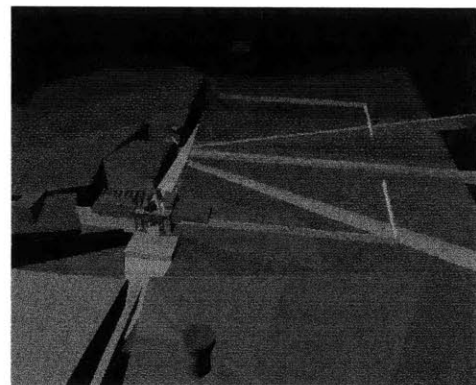


(figure 9.0) Thesis Simulation Example

1.<sup>04</sup> THE EXPERIENTIAL EQUATION

When we begin to explore and use architectural examples to represent different environments in the virtual landscape, exciting opportunities open up to us. However, inherent deficiencies in the media can cause a need for the development of other methods or recombination of representations to aid in comprehending the environment. This is analogous to the creation of traditional forms of representation. The plan drawing of Cambridge served to describe very well the relationship of how a place might relate to each other, but it tells nothing of the spatial experience. The section drawing was developed to begin to give that insight. This general statement can be applied to other forms of representation development.

Therefore, when we discuss the virtual environment, there are inherent deficiencies in every mode of representation, including the plan drawing. Each alone can not become the single answer for us to comprehend the space. Another example of this is the use of an animation through a space. It approximates walking through a space, but it can not provide a conceptual diagram of the entire layout for the space that a plan drawing can demonstrate. Nor can it give the vertical relationships that a section drawing can provide. In addition, it can cause the user to become a passive explorer of the space. The path is pre-determined which is not the case in a physical setting. An animation furthers one's sense of experience by setting the person's expectations to watch the action and not fully engage in its development as one might when moving from one space to another. The thesis addresses this illusion by providing a experiential three dimensional model in a VRML context, **Figure 10.0**. This provides the user with simultaneous interactivity and animation characteristics. Further descriptions of the thesis development and its relationship to the physical world will be discussed later in the thesis.



(figure 10.0) Thesis Experiential Example

**1.05 RELATED DISCOURSE - MILLER, ILLUSTRATION**

I relate the thesis to a book by J. Hillis Miller, *Illustration* who writes about the illustration and deliniates how a picture interacts with the view in very specific ways. This book gave me insight into the development of the interface and how to evaluate its formulation. Miller suggests that images by themselves do not always depict what was intended and can result in an adverse affect on its interpretation. The two examples I pull from his book are in **Figures 11.0 & 12.0**. The first is a drawing of Robert Lee and Stonewall Jackson on the morning of the Battle of Chancellorsville. What is interesting about this image as, Miller mentions, is the fact that without the label beside the image (*The Last Meeting of Lee and Jackson, 1869*), we would not be able to identify anything more from the image than what we could inherently read from it. The label, Miller suggests, supplements the image by providing an answer to the question who are theses poeple and adds a context to the image by providing a date. This tag can identify an image with a particular place, action or timeline. These last three components are very important in deriving the relationship between the image and the label.[Miller 92]

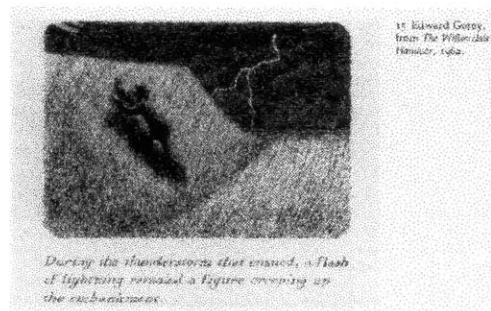
The other example given by Miller, in **Figure 12.0** demonstrates that without the short paragraph of information below the image, it would be difficult for the reader to accurately interpret the image. The paragraph says.

During the thunderstorm that ensued, a flash of lightning revealed a figure creeping up the embankment” [Miller 92]

This informs us that images and text supplement each other to give a more accurate interpretation of the information that is being presented to us. In the first example, we could deduce from the image that some discussion was occurring between Lee and Jackson, yet its context or anything else can not be extracted from it with any certainty. In the second example, the image could be showing any number of



(figure 11.0) *The Last Meeting of Lee and Jackson, 1869*



(figure 12.0) *The Willowdale Handcar, 1962*

occurrences and without the caption we would not get the sense that the figure was creeping up the hill. The illustration hints that this is occurring, but the writing helps to describe the scene. I will refer to this situation when the question of how to develop an effective environment for communication returns later in the thesis.

## 1.<sup>06</sup> SUMMARY OF THESIS RESULTS

Designers, I believe, have a new place to design, shape, build for human interaction to take place. How this can be accomplished, opens a lot of questions that I hope the thesis begins to address. What is most beneficial for the designer and the consumer of this new media? Can we use this media to express those ideas and in the process create its own place, its own form of representation? I call upon architects to seize this domain as a viable place to make architecture and to also create their physical architecture from the types of representations that are made from this exploration. I think that each can inform the other so as to enrich our experience of the virtual sites with physical world. The use of modeling, rendering, and animation software to realize our ideas of the built form is very effective for the production of architecture. But when we use the media for more than production, like interaction, then we must ask what kinds of interaction need to take place and how best to provide tools to allow for it to take place. My thesis tries to question these avenues and develop an interface for that to occur. Fundamentally the backbone of the interface originates from architectural examples, which is why the choice of a known built form was explored.

The development of digital media has created for the opportunity to produce thousands of images of our spaces. Animations can simulate the movement through the spaces. I ask what good is all this technology if designers think of it as simply a medium to produce “more stuff” but begin to develop what I like to call digital domains. These are essentially places for creation or interaction. A place for interaction between the user and the interface that is presented to them can begin to inform them of a digital place.

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# Chapter 2

## *unbuilt representation of a.....SPACE*

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### 2.<sup>01</sup> DISCUSSION OF PROCESS

While at MIT I had the opportunity to join a research grant headed by Takehiko Nagakura and Kent Larson. During the one year that I was apart of the grant, I built several geometric models of unbuilt projects. Those projects, created by various architects were not able to be realized during for various reasons. The first projects were unbuilt works by Lous I. Kahn. The last was the realization of Vladimire Tatlin's Russian Constructivist monument to the 3rd International proposed to be built in Saint Petersburg, Russia, **Figure 13.0** displays Tatlin in front of his tower photographed in 1920. The exploration of the digital media to closely simulate the actual environment was intriguing and demonstrated the scale of the Tatlin project along with its relationship to the City of Saint Petersburg. One of the most remarkable aspects of this particular project was the proposed scale. Tatlin proposed the height of the monument to be 400 meters tall. This would have resulted in the structure being larger than the Eiffel Tower in Paris. Tatlin only mentions the intention of this project, yet the actual construction and calculations for the design of the structure would have changed the design dramatically for it had actually been built. The digital context, however allows for this flexibility and we were able to reconstruct the imagery that Talin might have envisioned for the monument.



(figure 13.0) Vladimire Tatlin Russian Constructivist Tower



## 2.<sup>02</sup> REFLECTION/EVALUATION OF THE PROCESS

What this form of representation puts into question is originality of the imagery that we receive. We can begin to question if the image we are viewing is a computer simulation or the photograph of the actual piece of architecture as in **Figure 14.0**. How far should we take the realization of our virtual environments? Should we attempt to recreate our physical world in digital form? I do not holistically agree with that conclusion but I do feel that a certain balance between that level of representation can be very effective when the reality of building our ideas might otherwise become impossible, such the example of Tatlin's tower. Though our process of building the computer model, we quickly learned that the feasibility of getting the project built would have to be closely evaluated and major changes would need to be investigated. Yet, the presentation of the project in its intended context clearly redefines the scale of ideas outlined by Tatlin in 1920, as he stands in front of his scaled model. Therefore, while it is not possible to physically create the monument, it can be explored though the digital environment.



(figure 14.0 ) Computer Simulation of tower in St.

## 2.<sup>03</sup> RELATION TO THESIS

This is an example of an artificial environment created to simulate an object with the physical world. In one sense it represents the level of detail that can be achieved when we use this media to create digital architecture.

I return to the discussion earlier on the relationship of the virtual environment to the physical world. When we simulate an particular place, one of the questions that is raised is what level of detail do these icons begin to address? Should they be taken to the extreme where there is an indistinguishable difference between the physical setting and the virtual environment? The Tatlin project was such an extreme example of this merger between our physical environment and the virtual setting. Yet, can it give us insights into how far this relationship can be taken when we create these virtual domains? The connection made should be carefully implemented when the context is in a virtual setting.

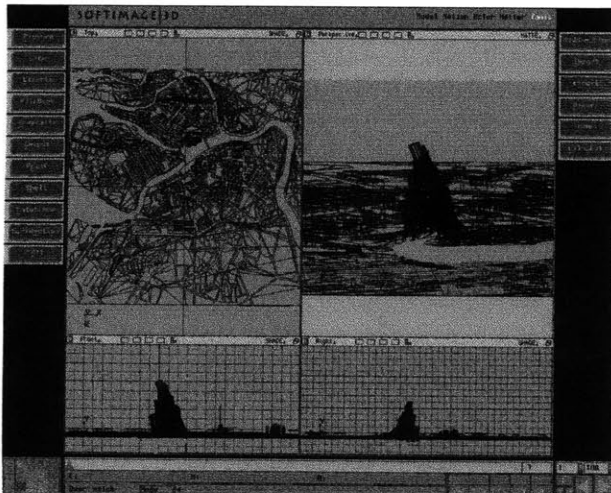


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*unbuilt representation of a.....SPACE*

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Communicating in the virtual environment can cause an apparent habitation of the environment. One could argue the level of habitation can be experienced on many levels, such as when I'm writing to a colleague on the internet or fully engaged in a vrml model. These are examples where individuals have a place to converse. One is built from a purely text based system and the other is built from architectural analogies. I think this is true in conception, but we have not yet created, in my mind, a place. I will introduce in the next section one of many examples that I believe carry this idea of a habitation in the Virtual Environment.



*Computer Model in SoftImage*

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# Chapter 3

## HABITATION *of the Virtual Environment*

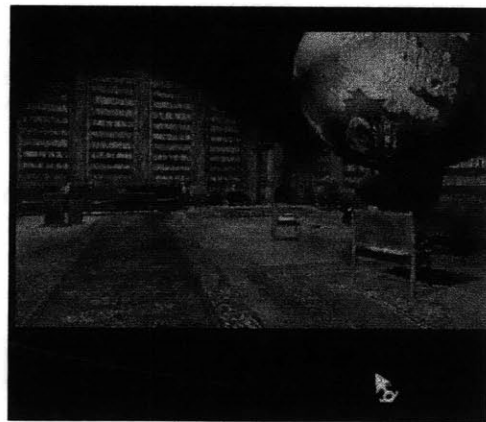
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### 4.<sup>01</sup> Zork Nemesis- action adventure environment discussion

The first example of an environment that relates to a physical architecture in a virtual setting is game Zork Nemesis by Activision. The goal of the project is to move from one room to the next, picking up clues to help solve the puzzles that are presented to you as you move to each room. The organization of the environment is clearly defined around a virtual castles. A major space in the castle is the library, **Figure 15** . It is used as the focal point in our understanding of the environment. What is interesting about this relationship to the library is its obvious association to a physical library and the knowledge that the space should hold information that will help in my interacting successfully in this environment.

The underlining structure of the interface is built on a point to point interaction. At each node you have a quicktimeVR node that allows for complete viewing freedom from that particular point in the environment. There are general one to three options from this position to take you to other quicktimeVR points. There are some instances that presents an animation between the points. The metaphor is directly related to the physical world and the imagery that is presented to the user is on that level.

How I come to understand the environment is through this connection to the physical environment. In the introduction of the environment, a short story is described as we fly into the virtual setting. **Figures 16 to 31** are screen shots of this animation. This is very important in the



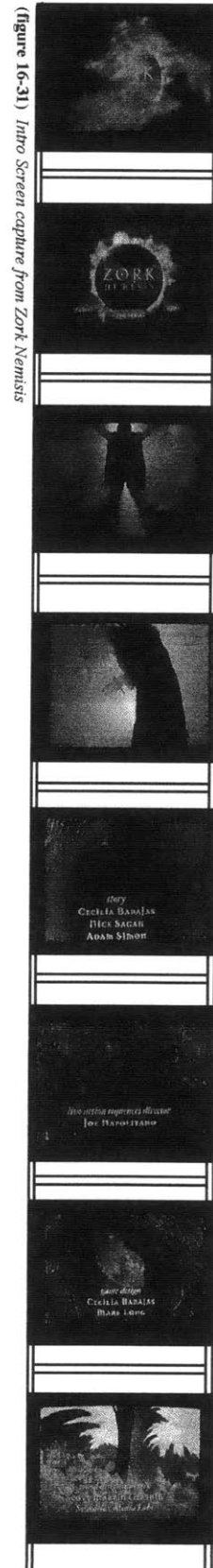
(figure 15.0) Library from Zork Nemesis

setting up our expectations for the environment. It hints about the type of environment we are about to enter and also provides us with a setting for arriving at a particular place. This is accomplished through views of the castle we are about to enter. This is analogous to a clearly defined entrance for a building in the physical setting. It helps orient ourselves to the context we are about to explore and sets our expectations for that environment. Without this piece of information, the virtual world begins to break down. Your expectations are not easily identified and the interaction then becomes unidentifiable. Imagine if this piece was not provided. It would serve then like Miller's examples given earlier. The environment would not have the appropriate label for a clear reading of the environment we are about to enter. The result would change our anticipation of the environment and might cause us to not interact with it on a purely exploratory nature.

### 4.02 ZORK RELATION TO THE THESIS

Zork is an example of a virtual domain that creates a place for the user to interact and understand the places that he or she encounters during the exploration. The interface works because the iconography is easily identifiable. It is an architecture of rooms in a castle that is presented to the user as you solve each puzzle. I interact with this environment through a mouse thus changing its representation as it encounters different regions on the screen. The feedback from this action is one which helps identify key elements in the image to the user and as you learn what each change represents, the interaction becomes enriched.

The point to point navigation also aids in alleviating the anxiety that might be felt to find or move very quickly through the environment. This is important because even as you get a sense that you are walking through these spaces, you are still an observer. The quicktimeVR node is advantageous than an animation through the spaces because when you are experiencing each node, your interaction allows for the flexibility to dictate your view. The result is very different from an animation through the spaces. You do not become a complete observer, yet your horizontal movement is generally only jump cuts to the



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## HABITATION *of the Virtual Environment*

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next position. The combination of the nodes and animation is very effective when it is implemented because then the two interact with each other in a way that enhances the experience. The animation provides an representation to movement through the space, and the quicktimeVR node can serve to represent resetting points in the space.

This is an important aspect when we think about using these new forms of representations to express the digital domain. If we are attempting to heighten that experience, then careful use of these tools can be implemented to express these notions. Zork applies this very well by providing a good mixture between when Zork wishes you to explore the environment and when movement is important to the experience. What is generally implemented is when you are meant to interact by searching your environment, the quicktimeVR is implemented and when there is clear movement needed, for example traveling up stairs, a animation is provided. What is also important to note is that this kind of digital domain serves as a good methodology for organizing your interaction into specific episodes. This may be advantageous to provide this kind of interaction because as was found in my development of the thesis, allowing the user to fully control his or her actions becomes a complicated issue. If an intended understanding of the space is anticipated, the design for such a representation must take more care in the subtle changes in how that interaction is to take place.



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# Chapter 4

## INTERFACE Development

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### 4.01 IAP INTERFACE DEVELOPMENT DESCRIPTION

The development of a CDROM was undertaken during the IAP period last January. I and another graduate student worked to develop a presentation/interface for a project created by the chairman of the Visual Arts Program here at MIT. The project was an art installation, built to display the relationship of the built form with water. There were five structures each having a different relationship to water. An example of one structure was the labeled the cloud building. This particular building had installed in it four to five thin pipes in the windows header to allow for the cumulation of mist inside the building as the water would be was pushed through it,

### 4.02 APPROACHES TO THE PROBLEM

Our task was to find a method to represent these structures. The objective of the project was to develop an environment that you could interact with and better understand the structures. **Figure 32.0** displays the main interface that is presented to the user after a short diagrammatic introduction of all pieces of the small village. The development of the interface occurred at two levels. The first on the scale of the individual and the monitor screen that one sits in front of when they interact with the program The second was how should the interactivity take place "in" the screen.

The composition of imagery, placement of animations and relationship to initial imagery was extremely important to the success or fail-



(figure 32.0) Main interface screen shot

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## INTERFACE Development

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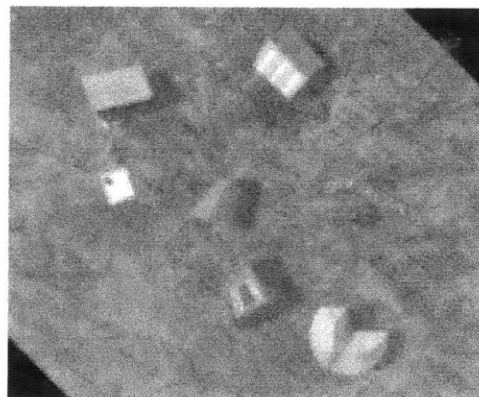
ure of the environment. The main interface had many opportunities to play with the edge condition of the screen and the local condition of each image. This is analogous to a physical drawing that might react or hint to other zones outside of its physical boundaries. This was the main reason for the positioning the different planes in the final image with the attempt to react with other edges of the drawing or the external edge of the monitor.

An investigation of a physical compliment to the interface between you and the machine. In our investigation, we focused our attention to a purely virtual site for the interface and as a result accepted all of its shortcomings. Therefore, the cursor/mouse interaction with the user became very important. We desired to minimize your recognition of the point and click relationship. This was desirable to introduce a spatial quality to the equation.

This particular interface consisted of a two-dimensional spatial problem. Therefore, the design was primarily implimented in this space. The implimentation of this , as a result, was the changing of the cursor as the user entered a new region of the drawing., Recognition of this change would occur as you encounter each different region. The three regions are shown in **Figures 33.0 to 35.0**. In architecture, an example of this kind of experience, would be a transition. The recognition of architectural transitions can become secondary to our recognition of the space you are entering and the ones you leave. Our recognition differences between spaces helps us to recognize and qualify those episodes.

I think that these are some of the issues that architects are equipped to challenge and are sensitive to if they are to become “digital architects”. My subtle cursor change demonstrates that the problem can became a spatial problem and it is an architects challenge to design this space and its interaction. How does this apply if at all when we move to the digital domain? An attempt to answer this question will be addressed in the thesis project.

Another objective for the development of the interface, was to create



(figure 33.0) Image used to link two-dimensional data



(figure 34.0) Image used to link object data



(figure 35.0) Image used to link immersive data



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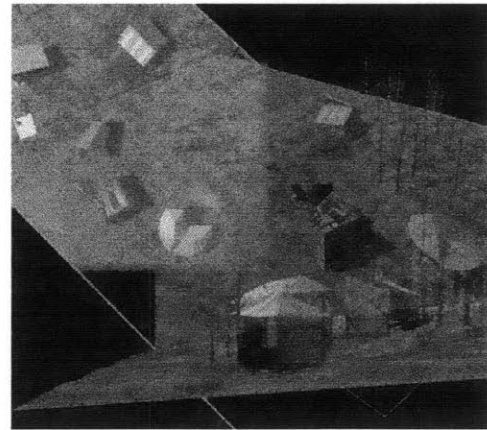
## INTERFACE Development

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successful imagery for the interface. one that would communicate with the user in a way that was familiar, yet informative. This imagery could then serve as the focal point for how the interface would be developed and exactly how the interaction would be accomplished. The problem broke down into three experiences. The first experience would look at the representation of two dimensional abstractions, such as plans, sections, elevation drawings for each of the five structures. The second would develop around viewing the entire project from the vantage point looking at the objects in the scene to get a sense of them. The final area I would look to represent an immersive quality where we attempted to simulate entering the site, approaching each structure and entering them to see what each held.

The problem was then to create an imagery that corresponded to each of the previous mentioned experiences and to create a transition between each representation in some meaningful way. The result was the main interface image that is presented in **Figure 32.0**. This is a composition of three potential interactions compositionally juxtaposed to each other. We further reinforced the transition between each part by linking an animation to the scene. The animation would begin and end on the exact images that are used to define the three regions. The objective was to create a sense of departure/arrival between each of the spaces.

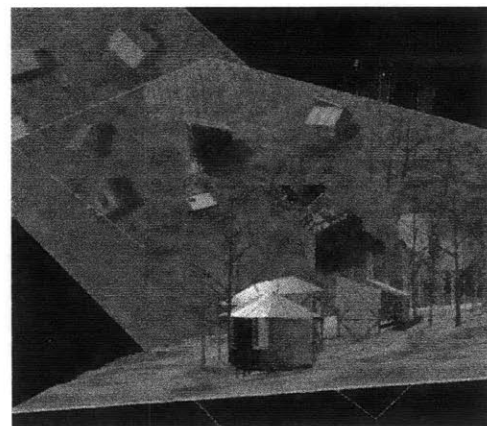
We extended this idea to attempt to minimize your arrival/departure experience. This allowed for then exchange between different representations to occur. For example, the transition between one zone and another would be identified through the animation. This kind of display would only occur when this transition was taking place, and a subtle shift in the foreground/background relationship. During this subtle change, the interface would stay virtually constant, and the only changes that would occur were were in the image you wished to explore, **Figures 36.0 thru 38.0** display the different results. Finally, you keep your point of reference in the virtual environment, because the initial interface is always present.



(figure 36.0) Main interface upper left selection



(figure 37.0) Main interface upper center selection



(figure 38.0) Main interface upper lower rt. selection

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## INTERFACE Development

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The last issue that was addressed in the development of the interface was the immersive experience. One of the powers of the digital environment today, as mentioned earlier in the thesis, is that we can begin to construct, with a certain level of accuracy, a simulation of reality. This can be very successful in communicating an idea and also very problematic. I refer to my example of Tatlin's Tower for insights into some of these advantages and disadvantages when we represent a digital domain at this level.

In the case of immersive qualities for this particular example, we chose a single motion path through the village to describe the experience between each building. This allowed for the structuring of the animation path into discrete points, during that animation that could link to other animations that would enter into one structure if so desirable. The interesting aspect of this methodology is that it creates a roadmap now one will move through the site. It however, widens the perception that you are observing the scene, rather than actively interacting.

### 4.<sup>03</sup> REFLECTION/EVALUATION

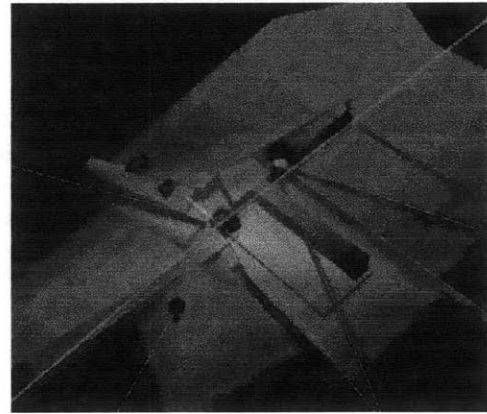
I have mentioned above, the interface that resulted from our work did not fully express the issues I have just outlined. Perhaps it demonstrated an unsuccessful interface. If you conclude the interface should engage your full attention on the explanation of the built project, then that it might be deemed successful. However, the objective of the project was to develop an interface and see what would be the issues when you actually did. The process, however, did inform me about interface development in a virtual setting and how one might think about structuring the problem. I will describe in more detail, this aspect in the creation of the thesis.



### 4.<sup>04</sup> RELATION TO THESIS

One of the issues that was learned and modified when I looked to develop the thesis was the choice of a VRML model environment as opposed to the two dimensional/animation approach. This was very important to give control of the environment back to the user. I also thought this changed the perception of the user from a passive user, as in the IAP example to an active player in the vrml model.

The second issue was the relation of an abstraction models to help enhance the interaction in a virtual environment. For example, orthographic projections can help orient the project and serve to organize navigating in the new environment **Figure 39.0** is an image taken from the thesis that attempts to capture this relationship. The IAP project showed everything about what and how the user could react to in the space. Everything was predefined and aided in the creation of the environment, but hindered the qualities of the environment. The last lesson learned from this exercise was how to conceptualize the problem in a virtual environment. I will discuss further this relationship in the next section.



(figure 39.0) Abstraction Model Example

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# Chapter 5

## COMMUNICATION *and The* ARTIFACT

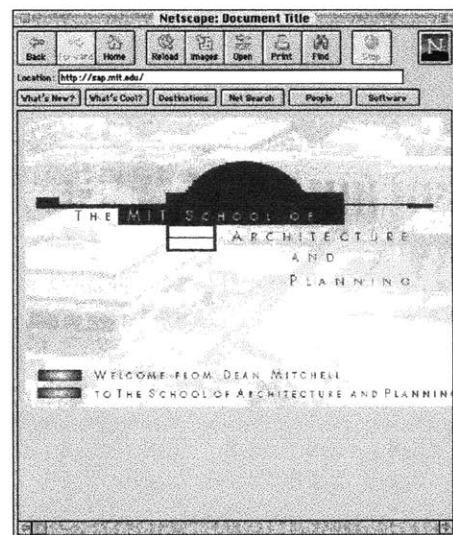
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### 5.<sup>01</sup> AFFORDANCES OF DIGITAL MEDIA

I begin the thesis topic for two reasons. The first was present the idea to designers for the creation of places in the digital domain and second to explore how one might put together an interface once there. I think the possibilities are enormous, but one of the beginning opportunities is for a designer to interact in the domain to communicate their architecture locally or globally. When I looked at this problem I thought how should I begin to create a representation for this to work. Therefore, I thought what did the media inherently present to the user and what was lacking from the nature of this representation.

### 5.<sup>02</sup> THE "SITE" THE WORLD WIDE WEB

The World Wide Web has grown over the past two years in astounding numbers. It has captured our culture in the same magnitude that the invention of the television created in the early 50's. Why is this case and what makes it so successful and serve today as a place for people to gather, discuss, shop, explore? One reason was the development of a graphical interface between humans and the machine. **Figure 40.0** shows an example from the Internet. This is analogous to the development of the GUI for computers started by Apple's desktop metaphor in the mid 80's. Most of the time, we can understand a graphical representation, easier and quicker than a text representation. Mosaic, the first graphical web browser for the internet, used a similar analogy in his development of the interface for the World Wide Web. Hypertext, the programming language for the internet provided a technique to link text and images



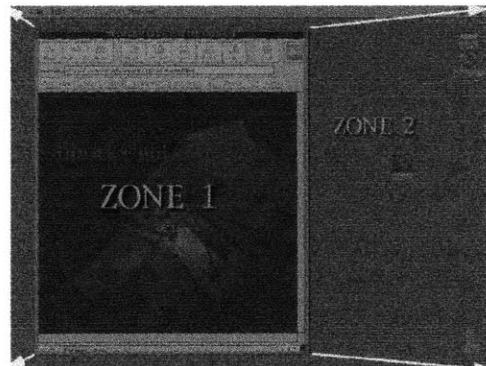
(fig 40.0) World Wide Web capture of Arch Home Page

5.<sup>03</sup> THEIS INTERFACE DEVELOPMENT

There were two levels of how I looked at developing the thesis. The first was the environment that is presented to the user. Today's technology currently only offers us the ability to see a screen and therefore limits our interaction with the machine only in terms of the mouse and our eyes.

The second looked at presenting the user with a three-dimensional geometric model of the architecture spaces here at MIT. I chose to create two different, but related representations. The first to provide the user with an environment that was familiar to them and one that had a set of representations that worked to help understand what we are looking at and attempting to inhabit. I mention this model as the simulation. The second, an abstracted experiential diagram of the architecture. I labeled this the experiential model.

When we are presented with the monitor screen as shown in **Figure 41.0** the focus becomes the application that was just opened. In this example, the application is netscape, delineated as zone1, while the desktop, zone2 fades to the background. We are still aware that the background exists and does not become apart of our main focus. This relationship stays with us all trough our experience and I believe hinders our ability to fully engage the medium in the same manner as we might cinematography. I draw upon the analogy of film here because much of the same interaction and spatial clues can be learned from this medium. The result is that we can begin to think about how to construct then a digital domain. Film presents us with a no edges on the screen. This is very important when we begin to relate to the screen and interact with it. Our eyes can then accept the edge condition of the device and our mind then can fully engadge the medias being presented. The flat screen is transformed into a live three-dimensional space that creates an illusion of a place behind the screen.



(figure 41.0) Screen relationship

The cinematic experience helped me to understand how to read and anylize the interface of the desktop and its relationship with the World

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## COMMUNICATION and The ARTIFACT

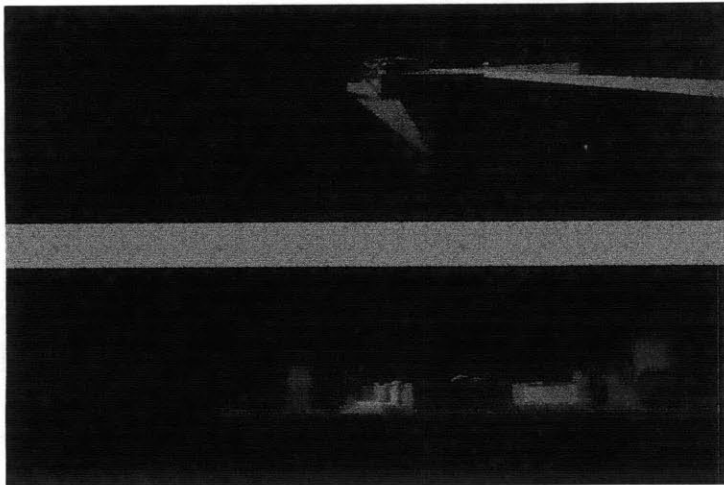
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Wide Web space. I considered issue to be a local condition (the desktop) and a global one(WWW). How the transition between the two is important for the user to experience a transition “into” a new space/domain.

The first attempt to make this transition feel as if were an edge condition to the domain, was to break down netscapes interface into no frames, no buttons, no URL message system. I wanted to use WWW's functionality of connecting to world wide sites but design its method of communicating that to you.

One of the major deficiencies I identified and began to try and solve in the thesis was the attempt to give the user an illusion that you are experiencing the artifact. Hyprealistic renderings, animations, VRML, all provide us with this illusion but there are currently no diagrams to help us to represent that experience. I choose for the thesis to concentrate on this idea. I attempted to supplement current representations by building a new representation for the a virtual environment

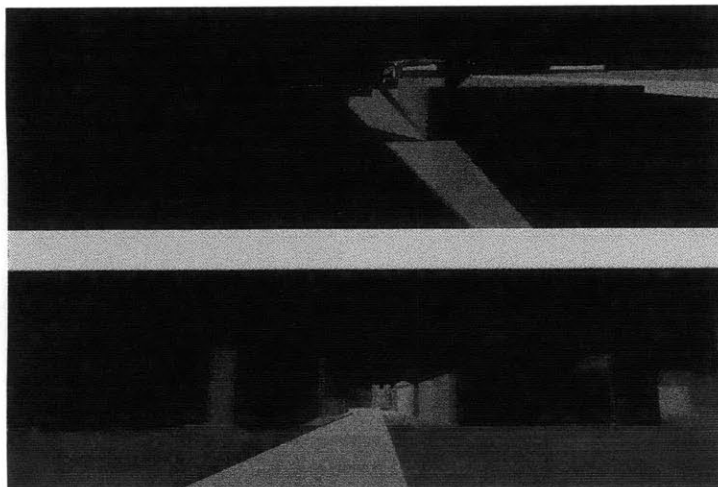
I call this the experiential model. To develop model I used a physical place as the frame of reference for its conception. The last set of slides of the paper attempts to display how this model was created by showing in slide form snapshots of the two models as you would walk from Boston to MIT in my virtual models. The upper image in each slide is the experiential model, with the lower one the simulation model. Try and notice the similarities/differences of the the images and then go out to the physical world and see if you read it in the same manner. The whole creation of the experiential model is derived from your the edge condition and the solid/void recognition of this experience. The idea is not that we have the same reading of the model or the physical spaces or even the virtual models, but that the representation can work to help describe and communicate some of these attributes for an effective digital domain. This idea is very difficult to describe or demonstrate in this media, so I will defer further descriptions of this idea to the presentation I will do on the work, which will be in video form.



**1.0** EXPERIENTIAL VRML SCREEN CAPTURE

**1.0** SIMULATION VRML SCREEN CAPTURE

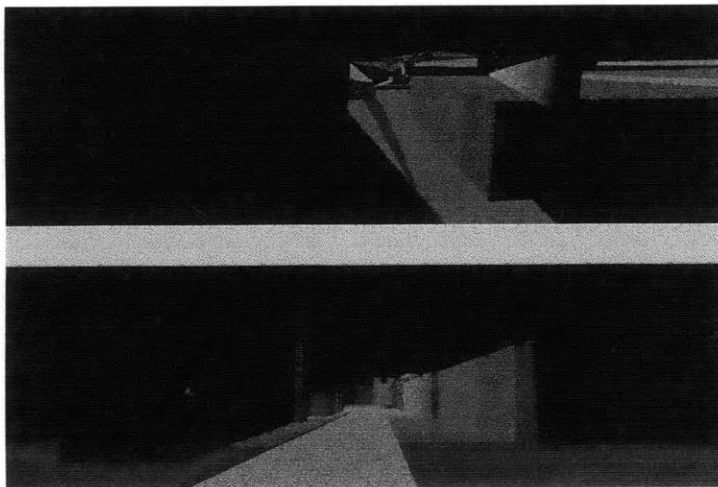
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**2.0** EXPERIENTIAL VRML SCREEN CAPTURE

**2.0** SIMULATION VRML SCREEN CAPTURE

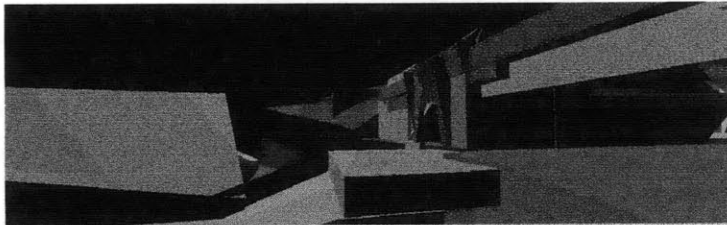
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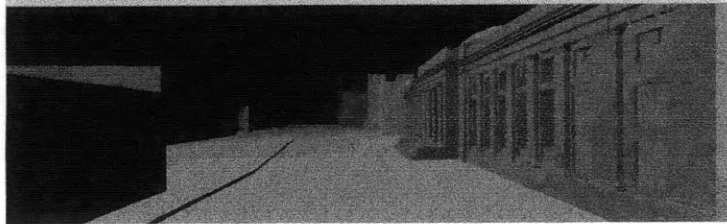
**3.0** EXPERIENTIAL VRML SCREEN CAPTURE

**3.0** SIMULATION VRML SCREEN CAPTURE

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**4.0** *EXPERIENTIAL VRML SCREEN CAPTURE*



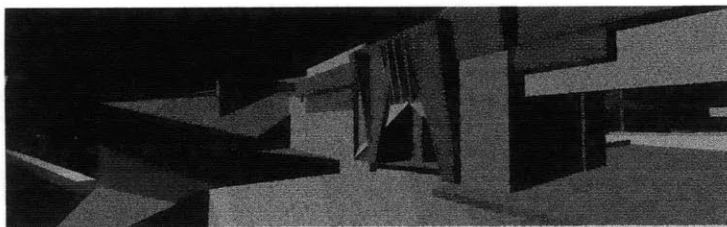
**4.0** *SIMULATION VRML SCREEN CAPTURE*



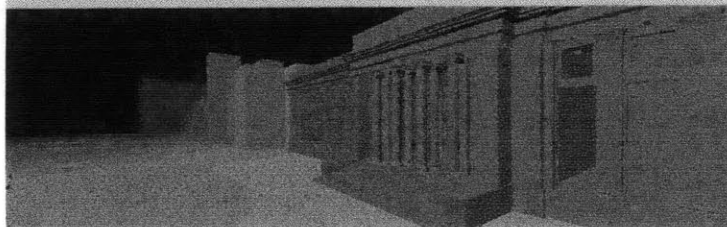
**5.0** *EXPERIENTIAL VRML SCREEN CAPTURE*



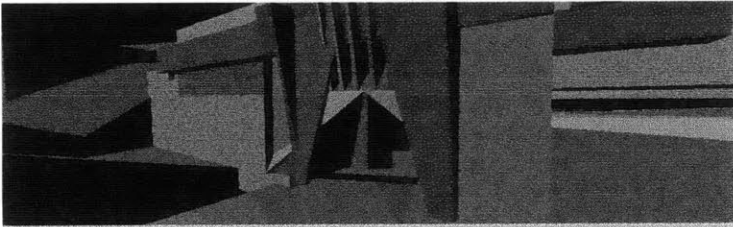
**5.0** *SIMULATION VRML SCREEN CAPTURE*



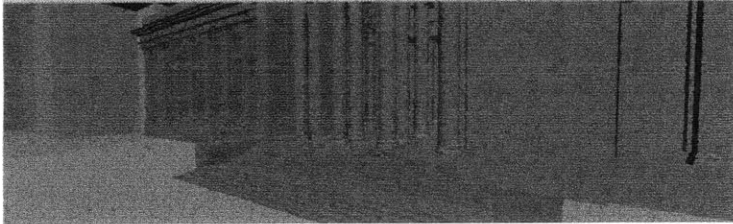
**6.0** *EXPERIENTIAL VRML SCREEN CAPTURE*



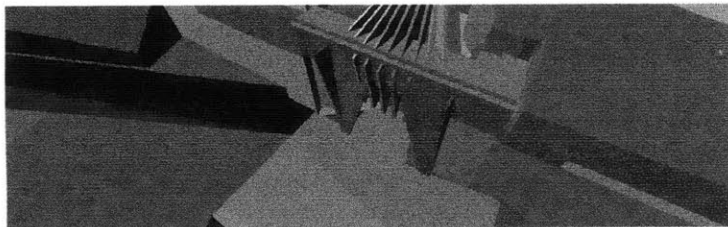
**6.0** *SIMULATION VRML SCREEN CAPTURE*



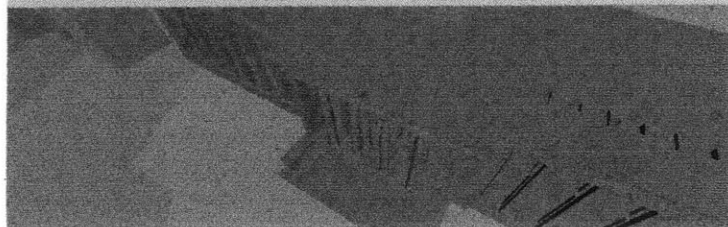
**7.0** *EXPERIENTIAL VRML SCREEN CAPTURE*



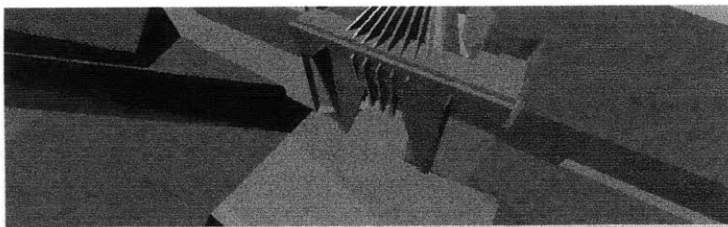
**7.0** *SIMULATION VRML SCREEN CAPTURE*



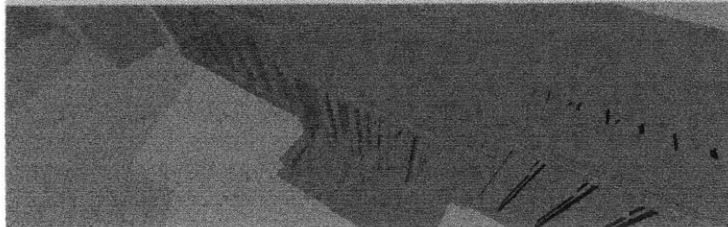
**8.0** *EXPERIENTIAL VRML SCREEN CAPTURE*



**8.0** *SIMULATION VRML SCREEN CAPTURE*

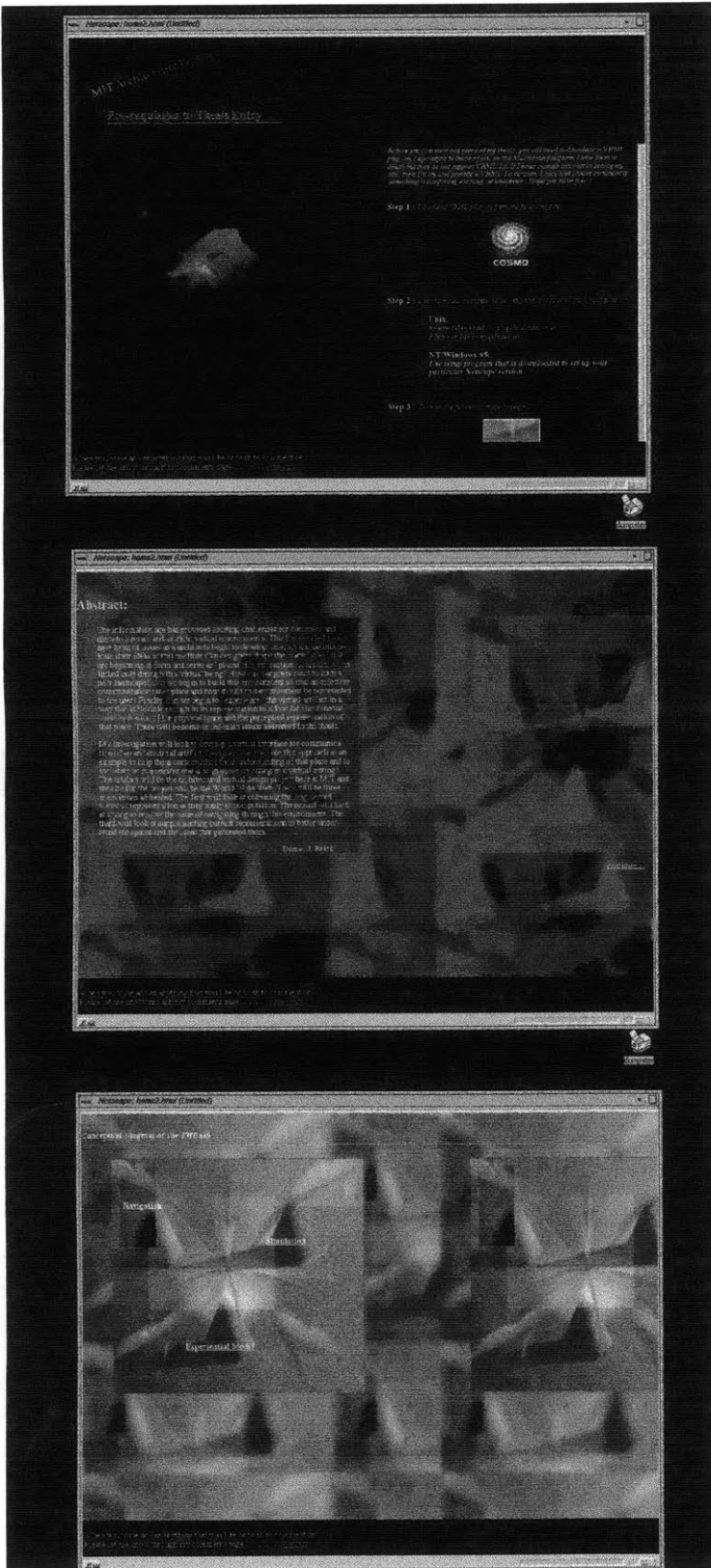


**9.0** *EXPERIENTIAL VRML SCREEN CAPTURE*



**9.0** *SIMULATION VRML SCREEN CAPTURE*



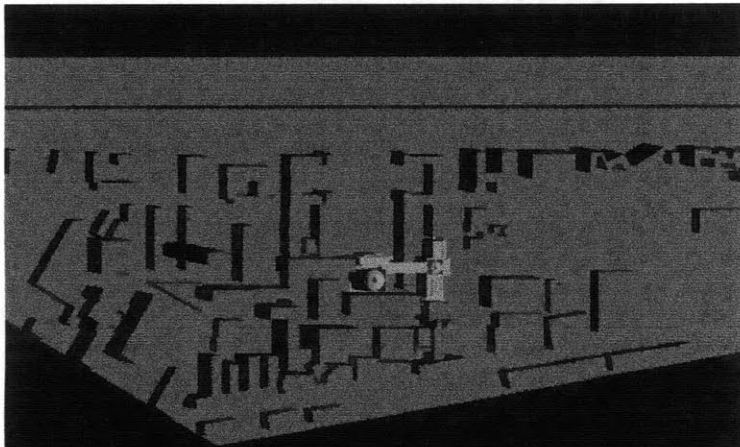


WEB PLATE 1.0 - INTRODUCTION

WEB PLATE 2.0 - ABSTRACT

WEB PLATE 3.0 - CONCEPTUAL DIAGRAM





**WEB PLATE 4.0** - PLAN DIAGRAM



**WEB PLATE 5.0** - MAIN NAVIGATIONAL PLATE



**WEB PLATE 6.0** - MAIN NAVIGATIONAL PLATE

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# Chapter 6

## THOUGHTS

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### 6.01 DISCUSSION

The thesis attempted to outline a methodology for architects to explore the creation of places in a virtual environment. My implimentation of this notion is by no means the definative answer to this very complex problem, It is just one solution. My hope is that users “see” what they want to see and come away with something from my observations or the choices I made to actually impliment its creation. If that is accomplished then I feel that I have communicated through the virtual environment. The creation of a virtual space and more importantly the actual development of an interface for that space is a challenge. There are difficult choices that needed to be made. In the case of my thesis, I felt I might have been too literal in translating architecture to the virtual environment, as one colleague of mine said “a one to one mapping”. I agree with this idea, but I see that there are presently few architectural representations in the virtual space. I can not see how this bridge will be built without its association to the built environment. I hope that my thesis at the very least introduces this idea and interests other architects to engadge in this type design. I also firmly believe that this exercise can not only be contained in the virtual environment, but can inform the physical making of arhitecture.

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## THOUGHTS

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### 6.<sup>02</sup> FUTURE DISCOURSE

The landscape for digital media is rich in opportunities. I see that as the technology is able to support architectural spaces for interaction, architects will play a major role in its development. Currently the virtual environment is uncharted and I believe it is the role of architects, social scientists to explore its potential as a viable space for the building of “Digital Domains”. I wish anyone who I hopefully inspired in some way, good luck, the task at hand I believe is far broader than my thesis addresses, but for myself, I will be continuing to solve this problem for years to come. I would like to note that if anyone becomes interested by the work that I did during my two years at MIT, to contact me through email, [djbrick@mit.edu](mailto:djbrick@mit.edu). I will be online for the rest of my life. I think that if you interested enough to read my thesis then my door is always open for you discuss whatever questions you might have had. This world is pretty small if we don't work together to make it a better place.

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