MUTUAL ASSURED DECONSTRUCTION:
AN EXPLORATION OF THE NATURE AND QUALITY OF COMPUTER-MEDIATED TELEPRESENCE

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by

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0.0 Abstract

Mutual Assured Deconstruction seeks to reflect and comment upon the implications of the networked society – through proximate and computer-mediated telepresent experience of a co-created sonic environment. Further fodder for exploration is the nature and quality of computer-mediated interaction and telepresence, the spatial metaphor as represented aurally, and the dichotomy of representational versus actual presence. However, the main purpose of this work is to examine the transformative effect that new media has on established concepts of space, experience and the body, and the set of relationships engendered by a performance situation.

Beginning with the rise in prominence of the concert hall in the late 1800's – and later, sound recordings – technology has been used to create greater separation in between composer, performer and listener. The majority of performances, enabled by the techniques of sound reinforcement, lighting, video projections, and modern building techniques, have evolved toward less personal, less affective situations. Sound recording technology has further distanced the members of the trio from each other – as the vast majority of auditions of a work now take place through recordings. A yawning schism has formed between the composer, the performer, and the listener.

Although some composers and performers have challenged this paradigm, the dominant idea of musical performance (in the Western world) continues to be concerts – which are highly structured, ritualized situations. The genesis of the structure and ritual surrounding Western musical performance can be found in the evolution of ritual surrounding the performance of the symphony. A cursory examination of this performance praxis gleaned from Christopher Small's *Musicking* yields several ubiquitous qualifications that define the nature of an overwhelming percentage of so-called "Classical

Music" performances. The work that is to be performed must have a definable creator that works in isolation from the audience. (That creator is (typically) male, dead, and of European descent.) A work so created by such a creator will pass unadorned through the medium of the interpretation of the performers, to a mute, respectful, receptive audience.* The nature of this social construction, indeed even the construction of spaces for music audition limit interaction, and promote the hierarchical relationship between the work being performed, the performers, and the audience.

Throughout the history of performance practice, technology has operated to distance the members of the composer/performer/audience triumvirate; however, technology can operate to bring these groups in closer contact – even blur the boundaries between the roles. Although there are those who deride the characterizations of the developments surrounding the rise of the Internet as a complex, multi-channel interactive network as naïve and utopian, it is indisputable that the rise of the networked society has provided a formerly mute audience with agency to *feed back* into the system of content dissemination. This development has gone largely unnoticed in the realm of Western music. Even in rock or jazz concerts, the audience remains a tertiary adjunct to the nature or quality of the performance. A computer network can provide the possibility of an asomatic experience, redefining fundamental notions of presence and absence. By making elastic the necessary connection between mind and body through the use of a network, we allow perception and action to operate remotely from the somatic self in a representational universe. By introducing proximate and remote *participation* into a performance situation, we redefine the roles of composer, performer and audience, creating a more egalitarian set of relationships.

How can technology serve to enhance a representational experience beyond the quality possible in a live-presence setting? How can telepresent experience be enhanced through

* Christopher Small *Musicking*

the aural and visual representation of a real-world space? Is corporeal presence necessary to achieve the highest levels of affect? These questions remain unsatisfactorily resolved.

There are two significant elements that I wish to explore in the course of this examination. The primary element is to create a musical-interactive space that can be inhabited corporeally and non-corporeally, where those inhabitants have the agency to mutually influence the outcome of the performance. In this thesis, I endeavor to re-define the broadcast nature of traditional musical performance-experience by extending the spatial metaphor aurally into telepresent space through synthesis of a sonic environment, permitting the same degree of presence and promoting the same level of affect both corporeally and non-corporeally.

The second element I wish to explore is the destabilizing affect that new media, remote participation and interactive, audience-directed performance have on the traditional artist-performer-audience triumvirate. By complicating this set of relationships with feedback channels and viewing/listening situations that were largely unavailable before the introduction of these technologies, the economy of power within the performance situation is fundamentally altered.

Although issues of presence and absence, telepistemology, and virtual reality have been explored to a great degree, these explorations have dealt largely with visual representational environments. By examining these issues and the relationships that surround them in the context of an aural environment, I hope to broaden the understanding of the implications of the use of new media in live and remote performance situations.

0.1 Introduction

I have been interested in the idea of telepresence and shared, computer-mediated, network-facilitated spaces since I typed my first conversation into UNIX Talk. The

thought that two people, however distant, could tread upon the ether to cohabitate in Gibsonian Cyberspace is incredibly alluring to me. The telepresent experience breathes new life into Descartes' epistemological doubts, all the while tolerating – even requiring – the existence of a representational environment. (Dreyfus, 2000) To me, sound is the most enveloping aspect of a spatial experience. In no other medium can humans concurrently perceive multiple levels of interaction. No other medium actively engages the perceiver, flowing out from the point at which it has been activated, perturbing all the particles in a space. Human skill at sound localization communicates an enormous amount of information about the quality of a space (its size, the texture and material of the walls, etc…). In a café, music may be playing softly from above, while the sounds of the other patrons' conversations fill a 360ª radius around us. An average person is capable of localizing even the source of an unseen sound. Further, the meaning conveyed by the medium of sound can be either quite abstracted – a string quartet, a symphony, or precisely concrete – the sound of a word, a birdcall or the noise of traffic, or machinery. In short, these influences are what have led me to wonder if it is possible to utilize technology to create a musical-interactive space that can be simultaneously inhabited from a distance and can be inhabited aurally rather than visually.

I believe that there are several affective elements necessary to creating an aurally inhabitable space or "soundscape". First among these is, of course, something in the space that can be heard. Also critical, is the ability for participants to have control over the experience—control most fundamentally evidenced in somatic space by the ability to move from one place to another. The only way to produce the illusion of movement in a telepresent space that is defined aurally is to alter the quality of sound field that the participant hears.

0.11 Performance Implementation

To create the somatically inhabitable space, at least nine musicians will each occupy one grid square in a large room (see illustration A). The musicians will each be provided with a sheet of music containing 24 *leitmotivs*. These motives are the key building blocks of the sonic texture, or *soundscape* that will be generated. The playing of the leitmotivs is governed by instructions detailing reactions to: possible actions that may or may not be executed by the audience members within the performers' sphere of influence, or reactions to the particular leitmotivs chosen by the other performers in the room.

In my proposed project, interactivity and the nature of presence operate in several levels. Rather than implementing the traditional broadcast structure of the musical performance relationship, the triumvirate of composer-performer-audience is altered to the point where there is a balance of power between the members. The audience becomes more than a group of passive viewers. They are co-creators, participants in the outcome of the work. The performers' relationship with the audience is altered from a purely broadcast relationship to a situation where the audience (now participants rather than audience) is in a position of some power and control over their own experience. The audience, through their actions in the performance situation, is essentially co-composing the resultant musical work. The participants are able to affect the outcome of the artist's work and the actions of the performers. Further, the participants do not have to be physically present to experience the event. Telepresent experience grants the audience a different and fundamentally altered perspective, enabling entry into a mutually co-affective relationship without being physically present where the performance is taking place. The musicians are directly responsible to the audience for faithful and meaningful musical interactions, and the artist/composer is recast as progenitor rather than creator. Within this reorganized triumvirate, each operand has the opportunity to redefine their

relationship with the other members, each placing itself more equally—creating mutuality rather than hierarchy.

0.12 Technical Implementation

The goal of the project I am proposing is to create an interactive musical event that is streamed live over an IP network. A key function of the technical implementation is to provide the participant with the ability to inhabit and experience the space aurally. There are several essential elements to executing this representation of aural space successfully:

1. The participant should be able to hear sounds from the live space in close-to-real-time.
2. The participant should be able to move around the represented space, and what the participant is hearing should reflect, to as great a degree as possible, the participant's position within the space.
3. The participant should willingly suspend disbelief that they are not actually present in the represented space.

The final goal—willing suspension of disbelief—may seem unattainable with present implementations of telepresent experiences; however, I feel that it should be held up as a goal for ultimate development.

In order to accomplish this, there are several technical obstacles that must be surmounted.

1. The sound must be captured.
2. The sound must be encoded and sent over the network.
3. The sound must be decoded.
4. The coordinates of the participant's avatar must be resolved to their position within the space.
5. The signals must be digitally processed to provide convincing positioning of the stereo field.
6. The sound must be played back in at least two channels.

The first issue that must be addressed is sound capture. I have been exploring three models for capturing the sound of the space. In the first model, 4 microphones are spaced evenly around the perimeter of the area occupied by the musicians. No delay is used, but the panning and level of each of the four monophonic sound sources is modified depending upon the participant's avatar's position in the representational space. Delay is generated by the real-world separation of the microphones. In this model, the microphone that is "nearest" the participant is the loudest, and the other three signals decrease in volume on a logarithmic scale depending upon how distant the participant locates his avatar from the microphone. Panning is controlled by the avatar's position in the room.

This model is the simplest implementation that permits a representation of analog motion within the space, though it does have the disadvantage of being the least sonically accurate. The technical core of this model actually occurs during the final moments of signal handling, when the sound signals are combined in a stereo field to create a simulation of the sound scene of the space inhabited by the musicians based on the location of the participant's avatar. This model will attempt to simulate the directional, proximity, and other spatial cues that occur normally in nature through a combination of the real–world delay, left–to–right panning, and level control. The structure of the sound–processing schema roughly mirrors the process outlined by Jean-Marc Jot in his paper: "Synthesizing Three–Dimensional Sound Scenes in Audio or Multimedia Production and Interactive Human–Computer Interfaces." That is, a tunable delay, panoramic potentiometer, and level adjustment for each signal, resulting in a modicum of spatial effect. With this model, the sound presented to the participant will be largely devoid of room effects such as reverberation, or the binaural head-related transfer functions, but the resultant sound should be able to place the participant in the space to a greater or lesser degree.

Once the signals reach the client machine, they will have to be decoded. The client decoder will be required to accept a four-channel signal rather than the typical two-channel signal. The decoder must deal with each signal independently, applying delay, panning, and level control as dictated by the mathematical model. In order to make this process accessible to lower quality end-user machines, the channels will be treated as if they were recorded in an open field. Rather than attempting to compute incidence, level, delay and reverberation for each recorded signal, we will eliminate the complex calculations required to aurally create an ambient room. Also, during the processing, the head of the participant will be treated simply – as a single point in space. In this fashion, we will roughly model a binaural listening experience, but discard Head-Related Transfer Function (HRTF) data that would require significantly more complex calculations on the client side.

There are two methods with which the signals can maintain synchronization during the transfer process. First, the four monaural signals can each be sent serially in separate packet streams – coded with longitudinal RTP time stamps. Once at the client machine, these packets could be re-synchronized based on the RTP time stamp. The other option is to send a single quadraphonic signal that can be segmented longitudinally. With this option, channel synchronization would be maintained; the decoder would simply have to be created to decode a four-channel signal rather than a two-channel signal. Since a decoder will have to be created to deal with four discreet channels of audio regardless of what type of packet divisions are made to the audio stream, I would propose that the second method—sending a quadraphonic signal, rather than multiple independent mono signals—would be less compute-intensive, and be less prone to error, packet loss and corruption.

In the second model, the instrumentalists are each recorded individually. In this model, it is more crucial that each signal be completely clean – devoid of ambient

reverberation. The goal in this model is to simulate a binaural recording – synthesizing the signals at the point where they enter the ears. Depending upon the participant's position, each mono signal is delayed, panned, reverberated, and assigned the appropriate level. This model, although producing a far more sonically accurate simulation, is more compute-intensive by a factor of 4. The larger number of signals to be sent presents greater problems of maintaining bandwidth for a continuous transmission. Each signal must be treated individually by the software necessitating more complex software, a higher processor load on a client-side machine. A software download also introduces an additional barrier to access, requiring the user install and configure special software for a one-time event (not to mention the costs incurred in the research and development of such software).

The third model would consist of placing several dummy-head stereo recording devices around the room, and simply streaming the audio signal from each device. Although this would have the ability of defining several discreet points in the room to a hyper-accurate degree, remote participants would be tied to the point of the recording transducers, and would be unable to move around the room in an pseudo-analog fashion by use of an avatar. There is also the problem that moving from one discreet point to another would cause an audible disruption in the program, requiring reacquisition and rebuffering of the audio signal. However, the implementation of this model would be significantly simpler, requiring little special software on either the client or server side.

The first method, although not as sonically accurate, will provide an adequate sense of space, and permit avatar-represented motion—two aspects that are key to the central goals of this project. However, without access to a programmer well versed in digital audio signal-handling to write custom client software for this implementation, there are not sufficient existing software packages that can handle or be modified to handle the demands of this model. Although the second model would allow more precise positioning of

individual sounds, and perhaps a better sense of place than the first, that the additional burden upon the client machine, the network, the server software, and the necessity of collaboration with experienced digital audio programmers, is not feasible with the goal of completing the project in the near future. I find the third model to be less ideal primarily because of the soundless delays that would be introduced while switching between discreet points in the room. However, this implementation is certainly the most feasible. Although it will not permit the simulation of analog motion within the space, it will provide the most essential elements of the project—asomatic participation, the ability to move about the space, and a highly convincing representation of the sound in the space.

After the initial recording of sound, the next step is compressing and encoding the sound for transmission. At this point in time, it seems that one of the best options for encoding audio lie with the MPEG 1 Layer 3 technology (MP3). This DCT-based wavelet compression engine creates extremely small file sizes—where raw audio files can be upwards of 1.4 Mbps, MP3 compression has a target bit rate of 64 kbps or less. For implementation of the first model—to send four synchronized signals—we are looking at a bit rate of near 256 kbps. This is definitely small enough to be transferred comfortably over the University IP network, and potentially to the Internet-at-large. For implementation of the third model, a target bit rate of 64kbps will permit streaming of a stereo signal. With this model, each participant will be connected only to a single signal, requiring less overall bandwidth on both the client and server side.

As a result of the research contained herein, and accounts of similar projects undertaken by others, it appears that this project will be no simple undertaking. Several large tasks will have to be completed in order to execute this project successfully.

1. Create an interface for the performance and small website to act as both promotional publication and "program notes" for the event

2. Obtain 4 computers to act as streaming audio servers. (Each should have a minimum 500Mhz processor speed, and an installed sound card that can accept a stereo audio signal.

3. Create 4 audio encoder/servers through installation and implementation of existing open-source software.

4. Obtain permission and cooperation from owners of high-speed Internet connections.

An objective analysis of the technologies available for telepresence shows a dizzying array of audio and video compression algorithms, layered Internet protocol suites, and videoconferencing, audioconferencing, and streaming software. There are a wide variety of technologies, both proprietary and open-source, that can be used to create a telepresent experience. As the field matures, I am sure that the offspring of some of the technologies I have surveyed during the course of my study will become standards. However, currently these types of systems are cobbled together using various technologies from varying sources—not always resulting in a harmonious marriage. This research will significantly contribute to the understanding and development of Internet-based telepresence software.

0.13 Related Literature and Artworks

I am principally interested in the presentation of music through digital media in new and unorthodox ways; ways that would cause the participant to question the nature and quality of the performances that he has seen in the past; ways that would illuminate the set of hierarchical relationships engendered by a performance situation. Additionally, I wanted to create a work that was "of my time." Rather than reaching into history for outmoded models of performance situations, I chose to create my own, incorporating many of the innovations of contemporary composers (antiphonal presentation, aleatoric, audience-directed co-composition) as metaphors of a technologically-based modern society (or

more accurately, modern society as I feel that it should develop). The genesis of this project in my mind can be traced directly to two progenitors.

The *Chat Circles* program – a spatially-based interface for chat-type interactions – created by students at MIT's media lab started me down the path the creation of a spatially based interface. Like Jorge Luis Borges' famous map, I began to wonder if it would be possible somehow to overlay, perhaps merge a virtual space (like the one created by ChatCircles) with a physical space.

David Rokeby's work, *Very Nervous System,* functioned in two ways that intrigued me. Rokeby's work uses video cameras, computers, and sound synthesizers to translate physical movement into digital cues. These cues trigger a manifestation of sound, thus allowing an affective aural relationship with a technological device. Or as Rokeby writes:

> The active ingredient of the work is its interface. The interface is unusual because it is invisible and very diffuse, occupying a large volume of space, whereas most interfaces are focussed (sic) and definite. Though diffuse, the interface is vital and strongly textured through time and space. The interface becomes a zone of experience, of multi-dimensional encounter. The language of encounter is initially unclear, but evolves as one explores and experiences.

Rokeby also creates the (unexplored) potential for those movements to operate in a telepresent space, by allowing the participant to inhabit and affect a virtual space. In Rokeby's work, the virtual space is manifest only aurally, and knowledge of this space can be observed only by perceiving the results of one's interaction with the parameters of the interface. However, as he states himself, Rokeby's primary goal is the exploration of the dialog between human and computer rather and the feedback loop created than the exploration of a reactive ensonified space.

0.131 Space and Place

John Dewey, in Art as Experience, suggests that all artworks have a common aspect, the parenthetical quality of the encounter with the art object. Dewey was the first to take a holistic view towards the critical assessment of art objects – lumping all the separate studios

(sculpture, painting, music, etc…) into one discussion of artworks; recognizing the experiential parallels between reading, viewing a painting, or hearing a symphony. For Dewey, artworks are each spatially and temporally set apart from other experiences. Each can be defined by the essential parenthetical quality of the experience. No matter what the details of wildly different experiences, an experience remains discrete from other experiences in life such as eating, sleeping, etcetera. In my work, it is this parenthetical nature of experience – as contained by space – that we are exploring. By extending an actual space virtually, we distort the boundaries of the experience, and perturb not only the social structure, but generalized conceptual models of the space. The virtual space of the web page, and somatic space of the gallery are each delimited from other areas, yet are permitted to interpenetrate and overlap. This interpenetration of space into space creates a *place* with unique social responsibilities and indistinct physical boundaries.

The second essential element of Dewey's concept of experience is the relationship between man and his environment. A relationship of some type must be formed between a human and the objects/creatures/people in the environment. In most somatic situations that we encounter, a frame of reference for behavior exists, we know what is expected, what actions are permissible and impermissible. Virtuality, as a new environment does not have sets of mores for behavior established as part of the *lingua franca* in Western society. Therefore, I intend to use this lack of pre-defined reference for behavior to disrupt the established ritual of music listening. Participants are forced to adapt old models for behavior to new situations, and re-place themselves within the performance hierarchy.

Peter Lunenfeld, in "Snap to Grid" states that though participation in a virtual world can be a liminal experience, it falls short of altering the fundamental nature of our perceptions of phenomena or our underlying personae, merely by transplanting interactions to a technologically mediated/created space. In my particular instance, remote participation functions differently than merely creating an interesting or unusual

experience for the participants. What I am proposing is the perturbation and deconstruction of the set of rituals surrounding so-called Classical performance situations through the use of technology. This perturbation will occur through the permissibility of actions that are prohibited in the concert hall—permitting a unique social construction of a virtual *place*. Technology that makes possible situations for participation in the performance ritual that were previously unavailable.

Steve Harrison and Paul Dourish wrote a paper for Xerox PARC examining the role of *place* rather than *space* in the creation of virtual architectures. Harrison and Dourish define space much the same way that Dewey defines artworks – as created, delimited areas, discreet from other areas. For Harrison and Dourish, *place* is defined as a set of conceptual and behavioral constraints – or a mode that one assumes when in an area where those behaviors are culturally expected. Essentially, place is a conceptual construct defined by the way people choose to use a space. Harrison and Dourish put forth the following definition for the concept of place:

> Physically, a place is a space which is *invested with understandings* of behavioural appropriateness, cultural expectations, and so forth. We are *located* in "space", but we *act* in "place". Furthermore, "places" are spaces that are valued. The distinction is rather like that between a "house" and a "home"; a house might keep out the wind and the rain, but a home is where we live. Please use the "right" quotes.

Harrison and Dourish also take great pains to point out that media spaces, and other "non-spatial environments" can also have the characteristics of *place*. What interests me are mutually co-affective spaces overlaid upon one another to create a *place* that is a unique blending of the actual and the virtual. Predominantly spatially-oriented questions are: whether telepresence brings the space to the participant, or the participant to the space, and further: where does the body end and the mind begin?

Further investigation into this topic led me inevitably to William Gibson. Gibson, in his novel *Neuromancer,* was the first to articulate a fictional bifurcated universe of

technologically created space that interpenetrated somatic space. Gibson's idea of a *cyberspace* – an electronically created landscape that coexisted with actual space and was richly linked through "jacks" – was the first proposition of a computer-created environment. In Gibson's world these spaces are mutually co-affective, and both pose a great deal of risk to the inhabitant – it is *fait accompli* that actions will cross over between the virtual and somatic spaces.

As a foil to Gibson, Hubert L. Dreyfus' essay, "Telepistemology: Descartes's Last Stand" collates and defines a list of limitations that keep current cyberspaces conceptually thinly linked to somatic space. Principal among Dreyfus' limitations are tele-reality's lack of *repleteness,* a fundamental lack of risk in all interactions, and the absent sense of intercorporeality, or the holistic, subtle and interpenetrating set of contextually dependant communication channels, versus independent channels of audio, video, haptics, etc.

In Dreyfus' essay, lack of repleteness is defined as a narrow bandwidth of phenomenological possibilities. For instance, in somatic space, the potential choices for avenues of action approach the infinite. Dreyfus, citing Albert Borgmann, explains that while driving a car, one may choose to drive off of the road, do a U-turn, or choose from multiple routes to get from point A to point B; one may exit the car to assist a stranded motorist. In a proximate situation, the opportunity perpetually exists to operate outside the rules of a system (provided that system contains the means to do so [a car cannot suddenly take flight, but can operate off-road or outside the scope of traffic regulations]). In a computer mediated tele-real situation, phenomenological possibilities are limited by an interface that defines only the permissible paths for a participant. Further, in a non-computer mediated experience there is the constant possibility of an unexpected event occurring. When interacting with a computer system, every phenomenological possibility must exist in some form *a priori*.

Dreyfus extends Borgmann's argument, citing a fundamental lack of risk in all mediated interactions. As Dreyfus says, remote controlled drone-aircraft that fly combat missions are certainly less risky for the pilot than actually being in the cockpit. Similarly, participants in a chat or e-mail exchange are more likely to exhibit inappropriate behavior than the same participants in a proximate situation. Dreyfus states that the perceived level of risk is lower in these mediated situations, leading to less appropriate behavior.

Dreyfus' point is that the seeming unreality of tele-reality, due to lack of risk, lack of repleteness, the technologically-imposed separateness of communication channels (e.g. dis-integrated presentation of aural, haptic, visual information…) and lack of a proximate human body "contribute to an attrition of our 'embodied' sense of the real world." Dreyfus claims that as we spend more time interacting through technologically mediated situations, somatic experience may take on the same "illusory quality and so seem to be in need of justification."

Although I agree with Dreyfus' points regarding the technological failings of existing tele-real experiences, I think that Dreyfus may be incorrect in his conclusions. The essential quality of doubt in a mediated interaction is simpler than the broad epistemological doubts of Descartes. In mediated interactions, I find myself wondering if the person with whom I am communicating is being honest, and what motivations govern the nature of the communication—the same doubts I have in any communication, be it mediated or non-mediated. I have never yet found myself doubting the existence of the person on the other end of the wire, nor do I doubt the evidence of my own senses with regard to that communication. I instead perceive that my senses have been extended—as simply as the television extends the reach of our eyes and ears, or the printing press extends the reach of our writings. Nor does the degree of mediation or the degree of remoteness lessen the sense of being-in-the-world. Besides, how different from our nervous system are these networks? Both use electrical impulses to communicate data from

sensory input organs to a processing device… Dreyfus seems to miss the fundamental point, implying that epistemological doubt is directly proportional to the spatial remoteness of perception. However, mediated interaction between two beings is mediated interaction whether the cable connecting them is 5 feet or 5 x 10^23 feet. Does epistemological doubt increase in direct proportion to the length of the cable? The Cartesian schism between mind and body does not ring any more true for me in mediated experiences than it does in proximate experiences.[†] However, Dreyfus does bring a quite helpful meme to life. Dreyfus suggests that the most important aspect of telepresence involves "getting a grip on something at a distance." This simple statement encompasses essentially what I would like to provide – an aural "grip" on the quality of the shared space, experienced remotely, and a conceptual "grip" on a new model of performance participation and audition.

In the proposed event, it is essential that virtual participants be able to observe the (albeit slightly delayed) reactions to their movements and textual input. Thus obtaining evidence of the near immediate effects of their actions upon the evolution of the piece. Participants are assured that they are an involved participant, rather than a passive recipient. Here, participants are interacting with performers and the other participants through the medium, rather than with the medium in a pseudo-interaction/decision tree/prepared response situation. Participants have a greater power to direct the outcome of the event – fundamentally changing the musical performance dynamic.

0.132 Power and Ritual in the Performance Dynamic

The performance dynamic I choose to emulate is detailed in Michael Brocken's lucid description of the political economy of power in a Folk Club performance. Brocken

[†] However, within limited rules-based formal systems, such as a game of chess, it may be possible to create doubt that interactions are being made with an artificial intelligence versus an actual human. But in virtual games, there is typically an unstructured social dimension to all game play that would not easily be synthesized.

characterizes this political economy as: "[a] socio-musical democracy and de-staging; around a concept of a non-audience and an equally valid participatory listener…The organisation of performance space had to include the serious listeners for they were regarded as equal to the performer in every way." In Mutual Assured Deconstruction, the listener/performer line is blurred further as the performers take direction from the participants. This fifties-era idea of perturbing the performer-audience relationship was pioneered by John Cage.

Cage, in his book *Silence* speaks to the future of music – of composers using *electrical instruments* to create fields of *organized sound* that may be played by the composer directly for the audience – eliminating the performers as a component of the dissemination of music. Cage's desire to firmly shake the foundation of the audience-performer relationship can be seen most strongly (and most sensationally) in Cage's musical work 4'33". In this piece, a pianist sits at the piano for four minutes and thirty-three seconds; opening and closing the lid of the piano at prescribed points during the time span without playing a note. Cage's intent was to delineate the sounds of the audience in the space of the concert hall, co-opting the sounds of the audience as the sounds of the performance. In effect, for that time period, the audience became both performer and audience.

Roland Barthes refers of the death of the sole author with the advent of hypertext documents. Here, this "death" is not a death at all, but a fundamental alteration of the ritual of reading. Documents by myriad authors can be read in a non-linear pastiche of prose interconnected by referential links. In the same fashion, the birth of asomatic participation in digital, media-based artwork fundamentally alters the ritual of perceiving art. Walter Benjamin first pointed out that technology could alter the meaning of art-objects. Benjamin's observations apply not only to new artworks, but also redefine

previous artworks and the rituals surrounding them in opposition to other works.[‡] I would fuse Benjamin and Barthes' assertions to say that technology fundamentally alters the meaning of and the rituals surrounding the perceiving of artwork. The rituals that we have grown accustomed to having as a fixed element in our lives change, and the change in those rituals reflects upon us a certain incompleteness and nostalgia for the known, the comfortable. This schism between what is *actual* and the longing for what was *known* through ritual sets up a Lacanian conflict at the very core of our identity, for these rituals serve to validate our Identity and place in society. As technology advances, we must avoid clinging to those outmoded rituals, and create new rituals or modify the old, to more properly reflect new surroundings and altered social reality.

In 1998, Christopher Small published *Musicking: The Meanings of Performing and Listening,* which I find to be the most compelling work I have read critiquing the issues of power and representation surrounding "Western Classical" musical performance situations. The manner in which Small examines the performance situation is an analogue to Dewey's examination of artworks. First, Small examines music as an experience rather than an object, and second, evaluates the quality of the complete experience. The evaluation of all aspects of a musical experience provides a clearer picture of the meaning of the event, rather than simply evaluating a single channel of the experience.[§] Small's book is intended to answer two questions that he feels have not been adequately addressed by previous writings on music, and these are: "What is the meaning of music? What is the function of music in human life?" While this book may not provide complete answers to such broad questions, it does provide an extremely detailed description of the ritual and

[‡] Though Benjamin was discussing works reproduced mechanically versus those works that were created before mechanical reproduction was available, his observations can be successfully extended to cover other technological innovations. For instance, media artworks are placed in opposition to those works that are *not* media art, *not* participatory, *not* viewable/hearable asomatically)

[§] Evaluating the playing of music for listeners, or simply the harmonic and melodic qualities of music itself without considering the architecture of the space or the social roles of the participants would be an example of a single-channel evaluation

analysis of the meanings surrounding Western Musical performance situations. Small postulates that music is an activity rather than a thing or commodity; that performance situations are events that are filled with ritual and meaning; that they provide the opportunity for participants to re-affirm their role in society through these rituals. In the case of Western music, a performance is a set of rituals that mirror an antique set of political structures and social attitudes, an exclusive performance for a Noble audience. Small rightly points out that the Western performance experience is not simply limited to the musical performance itself. The ritual of performance is significantly more complex than a performer-audience relationship. The performance experience should be extended to include the ticket takers, the socialization of the audience in the antechamber, the separation of Composers, performers and audience, and even the very architecture of the performance space (Small, 1998).

Internet Cultural Researcher Sherry Turkle writes about Western desire for ritual in the following passage:

> Many of the institutions that used to bring us together – a main street, a union hall, a town meeting – no longer work as before. Most people spend most of their day alone at a screen of a television or a computer. Meanwhile, social beings that we are, we are trying (as Marshall McLuhan said) to retribalize. And the computer [and new media] is playing a central role.

Turkle and Small illuminate the same point from different angles. Our society is laden with rituals that affirm our role (or perceived or desired role) in society. Small acutely examines the ritual nature of music making and audition, and by proxy, all artmaking and art viewing. In Small's mind, Western artmaking and display largely conform to the theory of the Spectacle described by Guy Debord. In his writings *The Society of the Spectacle*, Debord detailed the transition of modern, capitalistic society into a society of where people form only transactional relationships, and are relegated to a passive role in these relationships. The key element of this theory is the concept of the Spectacle—emphasizing the separateness and powerlessness of individuals, as they are

relegated to the status of passive consumers. Debord's primary contention – indeed it is his first thesis – is that in modern, industrialized society, life is not "directly lived." The meaning of all actions has been relegated to representation.

The group, Situationist International arose around Debord's writings, and was interested in creating events that promote the involvement of the individual. Like these situationist events, Mutual Assured Deconstruction requires that individuals participate for activation, structure and control. The Internet enables individuals to communicate at will in a complex interpenetrating web of relationships and mutual co-affections. Mutual Assured Deconstruction uses that hierarchy, or lack thereof, to explore the social nature of a hybrid virtual/somatic space, and to promote the activation of the individual through interaction that is contrary to expected societal models of *place* as pertains to music audition.

Debord's points regarding the meaning of actions are important to this work; within the context of an event, importance of an action can be determined only by observing the relationships between the actions themselves and the actions in relation to the parenthetical frame that delineates the event. The frame of an event can be defined in many ways, and Dewey's spatial and temporal boundaries are most readily apparent – even to a casual observer – though sometimes overlooked. Harrison and Dourish point out that the essential quality defining a *place* is social, not architectural. Small and Turkle's writings bring to light the nature and meaning of the social constructs and ritual within the space and place where the event will exist. Small delineates the social qualities of the concert place as experiential; and Debord warns us of the power present in systems of content dissemination, where people have been trained to assume passive roles in solely transactional relationships. This fusion of thinkers along social and spatial lines is the touchstone for these explorations.

The nature of space – both physical and virtual – and the social construct of *place* within those spaces are the core questions of this entire exploration. Further, it is not my intent to create a spectacular event, where the participants feel powerless to affect their environment. Participants should gain a sense of power and agency as they realize that their actions are guiding the development of the work.

The networked society demands that we reinvent or modify our rituals to replace defunct or irrelevant models. Through reactive co-composition, the creation of a unique somatic/virtual space, and the context to encourage a socio-musical dialog between performers, remote and proximate participants, I hope to create a unique *place* and a set of rituals that reflects our contemporary society. MAD will reflect the networked nature of our lives, the constant flow of information between us, the sometimes-impossible task of reacting to all stimuli in a coherent manner, and the decline of the prominence of a single author in favor of a group of co creators.

0.14 Open questions

The creation of this work has raised several questions to the nature of my work as it relates to my objectives. Does the creation of this piece merely represent the substitution of one constructed and arbitrary environment for another set of organizing principles, just as arbitrary in conception? Here I say that this is not the case. That it is the meaning underlying these rituals that is at issue, not the artificialness of the environment. Sidestepping the impossible task of defining what a natural environment might be, let us merely look at the underlying meanings engendered by this arbitrary construction, and how they compare and contrast with the meaning present in the existing arbitrary construction.

Could this piece be executed without the use of technology? Why is technology essential to the execution of this work? Technology is quite central to the execution.

Before the advent of the internet and multimedia transport protocols, it was simply not possible to remotely experience a mutually co-affective performance situation. The utilization of the Internet, though (currently) inherently unreliable, makes it possible to arbitrarily bypass many of the rituals of the performance (i.e. dressing, driving, socialization) and substitute for these the ritual of employing a technological device to attend a live performance.

I question whether the attendance in a technological fashion should be characterized as bringing the visitor to the space, or bringing the space to the visitor—and how important is this characterization? The noesis of virtually created spaces is a dissertation in its own right. However, I shall make an attempt, within the scope of this project to suggest further directions for study. In the lexicon of Internet jargon, Remote controlled pseudoforms are characterized as *avatars*. The word avatar is etymologically derived from two Sanskrit words, ava (down) and *tarati* (he crosses).** Avatar refers to incarnations of Hindu gods upon earth (in the form of people, dogs, etc…) where the god has bodily come to Earth. This would suggest that the mental model for participants in telepresent activities implies sending your presence *out*. However, William Gibson in *Neuromancer* describes spaces that do not necessarily behave according to Newtonian (or Einsteinian) laws of space. The outward appearances of Gibson's objects belie the amount of space they can contain. Gibson's space can unexpectedly shift, and references to physical distances can be either magnified or obliterated. In short, virtual spaces, though referential of physical spaces, are not constrained by the laws of physics, and should not be constrained conceptually by a tenuous referential connection to actual space. If space is elastic in a virtual world, cannot presence be elastic as well?

Finally, it is essential that the interactions that are to occur in the context of this event emphasize the coexistence and mutual influence between all participants. Telepresent

experiences need not be cold, technically dominated, and separating. Technology and telepresent experience should be used to create new conduits for human expression and communication and be used to generate new phenomenological possibilities.

[**] The American Heritage Dictionary of the English Language: Fourth Edition. 2000

1.0 Implementation and Denouement

The event took place at the Victoria Myhren Gallery on Friday, November 9th, 2001 from 7:00 PM – 9:00 PM (-0700 UMT).

Setup of the physical space was accomplished in the three days immediately preceding the event. The first, and most important technical aspect of the setup was to install the computers and projectors, and ensure that each machine was networked for streaming audio from the gallery. 4 pentium P733 machines, each with a stereo PCI Soundblaster 32 bit soundcard, were allocated as audio servers (one for each microphone pair in the gallery). To facilitate setup, I created an install CD for the audio servers, containing the Shoutcast Streaming Server software, the latest version of Winamp, and additional system patches and updates to facilitate digital audio handling. Each machine had to be configured to broadcast over the University IP network by adjusting the networking settings for each machine and assigning static the IP addresses allocated from the University's IP address pool. Coordination with University Information Technologies was necessary to ensure that IP addresses and network access would be available from the gallery, that the proper ports would be open on the University firewall to permit audio broadcasting as well as incoming and outgoing chat, and that bandwidth would be allocated to facilitate smooth connections. The audio software was configured to broadcast on port 8000 and receive tracking/quality information from connected users on port 8001.

Further, two computers (Pentium P133s) were set up in the gallery space to provide video of the ongoing chat for the data projectors and serve as chat stations to permit the somatic participants to cross over into the virtual space. These computers utilized the mIRC chat client software, which runs on port 7000.

To most closely resemble the signal pattern picked up by human ears, two omnidirectional microphones were placed with the elements approximately six inches

apart in a "Y" mounting pattern. Each microphone pair was placed exactly four and a half feet above the ground – the approximate height of the ears of a seated person. Each stereo pair was connected to two channels on a mixing board and each signal was panned to the extreme left or right, as appropriate. From the mixing board, each signal was routed to a track on a digital 8-track recorder, to document the audio from each discreet point in the installation. The sound was routed out of the digital 8-track, and each stereo pair was sent to the sound card line-level input of one of the four audio servers. The four audio servers each streamed a 40 kbps, 22.050 kHz stereo signal. Access to the signal was enabled through a web site built as the interface, with a chair in a representation of the gallery space that was referentially placed to emulate the physical-world position of the recording transducers.

One of the last decisions made during the setup of the event was to have computers as chat clients available within the space. I was concerned whether there would be sufficient virtual attendees to sustain an ongoing chat, so I chose to have direct access between the somatic and virtual spaces. This turned out to be one of the best decisions made in the course of the implementation of this work. The computers (only 2 stations) were accessible to the somatic participants and greatly facilitated interaction between the remote and proximate participants and between the participants and the musicians. Proximate participants were significantly more willing to interact with the musicians when the interaction was technologically mediated. Within the virtual space, the proximate participants who avoided movement and direct interaction in the physical space, were uninhibited about calling for specific motives while using the chat software, *playing* with the cause-effect relationships of the piece, or having an ongoing text conversation during the performance. More than once, I witnessed proximate participants reading the words from the musicians' scores, and typing those words into the chat. On-line users were not abashed at all, and were quite willing to discuss aspects of the piece; some even asked

questions like "What is going on here?" Most on-line users did take the opportunity to hear the event from more than one point in the room.

The musicians, coordinated by Conrad Kehn, arrived at 5:30 that afternoon, to rehearse the motives and prepare for the evening. The group was comprised of a Bb Clarinet, Eb Alto Sax, Trumpet, Trombone, Accordion, Electric Guitar, Analog Synthesizer, Percussionist, Violinist, and Violist. For rehearsal, Conrad led the entire group in a simultaneous playing of each of the motives. After a short break, the musicians returned shortly before seven o'clock to begin the performance.

At approximately 6:45 PM, a final test of one of the streaming servers that had been working quite well earlier in the day revealed that audio was not passing from the sound-card input to the outgoing audio stream. After a few tense moments, it was discovered that other sound software had co-opted all the servers' sound resources for it's own use.[††] Resetting the sound settings and restarting the machine alleviated the problem.

Another technical problem that did not affect the quality of the event, was the performance of the digital 8-track recorder. At several points in the evening, the tape deck experienced an error and stopped recording (though fortunately, this did not affect the play-through of audio to the streaming servers). The error seemed to be caused by a defective recording cassette, for once the cassette was replaced the deck worked quite well. Unfortunately, repeated errors on the flawed cassette destroyed the recording for the first forty minutes of the performance. sixty minutes were recorded on the second cassette, requiring a tape change with less than five minutes of the event left. Not wanting to miss experiencing the end of the work, I chose to allow the final minutes of the performance to go unrecorded.

Hesitancy and tentativeness marked the first 20 minutes of the musicians' playing and the reactions of the proximate participants. The musicians were plainly unused to such an

[††] We had been using that machine to play MP3s while setting up the space.

unorthodox situation. Participants tended to cluster in the hall leading into the gallery space. Although all the players were seated at least eight feet apart, participants remained apprehensive about entering the space occupied by the musicians for about the first 40 minutes of the performance. I was quite surprised that despite the perturbations in the architecture of the rituals surrounding the event, people are strongly conditioned to remain still and quiet while music is playing. In order to seed the interaction (and avoid blocking the entry to the gallery), I asked the gallery associates to encourage the participants to move into the space. For the most part, direct interaction between proximate participants and musicians occurred only when the proximate participants were young children, and did not know the learned rituals of attending a musical performance.

After the first twenty to thirty minutes had elapsed, the musicians began to play with more self-assurance. The violinist reported that after some time had elapsed, for her, the dialog between the players and participants began to take on more meaning. She explained "The children were *Joy* for me." (Joy being one of the leitmotivs – see Appendix B) The musicians also began to interact among themselves. At one point several players can be heard repeating the *Hungry* motive and laughing. This laughing sponsored the *Joy* motive in some of the other musicians. The laughing and shrieking of attending children is nearly always clearly echoed by many presentations of the *Joy* motive. At another point in the evening when the number of participants had noticeably thinned, several of the players began repeating the motive expressing *ennui*.

Musically, the only one fault occurred, and that at the end of the evening. I feel that this fault was due to inadequate precision in the performance instructions. The directions for performance issued at the initial presentation read:

> The piece is ended at a prearranged time, when musicians will begin playing the Goodnight motive. When everyone in the room is playing the motive, the piece may be ended by a signal from one of the players.

Since then, I have added the following text between the two sentences shown above: *As before, unison playing should be avoided*. As the musicians began playing the *Goodbye* motive, they also began to synchronize their playing with one another. I theorize that after an evening of playing disconnected referential bits it was rather satisfying to speak so powerfully as one voice. However, it was not my intention to have such a clear and dramatic ending.

One participant (Trace Reddell) reported attempting to construct a composition within the larger scheme of the piece by performing certain actions to elicit given motives. This participant reported less than satisfactory results in this instance. He felt that the performers' responses were not plainly the result of a cause-effect relationship between his actions and musical reactions. Although it was originally my intention to have musicians be more directly responsive to the participants, what actually occurred were several levels of conversation and social behavior. The musicians were carrying on a musical dialog that was influenced by the actions of remote and proximate participants and the other musicians. The remote participants (and proximate participants participating remotely from within the space) were carrying on a texted conversation that was influenced by the musical dialog; and the proximate participants' conversation was influenced by the musical conversation, the remote conversation and the proximate conversation.

Although it was not my intent to create this particular web of conversational relationships, as a model of the networked society, it is perhaps fitting that the actual development did not exactly parallel the intended development.

I consider the performance to be a success. Technical problems that interfered with the quality of the event were completely avoided. For documentation purposes, a sufficient amount of the event was recorded through video, audio and photographic means. The social nature of a de-staged performance was completely maintained throughout the

evening, and many of the participants did enter into a mutual interaction with the musicians.

1.1 Future presentations

Since the event of November 9th, 2001 I have been soliciting various higher education gallery spaces to host a second exhibition of this work. The things I would change in a second performance are refinements of the initial presentation. More computers would be available as chat clients from within the space. The single most-used path for interaction was a proximate participant interacting with the musicians through the use of the chat space. This would make the virtual space more widely accessible by proximate attendees. Another issue was the paucity of remote chat participants. The large percentage of remote participants elected not to participate in the chat. Although this behavior is to be expected, I strongly feel that a tighter integration between the sonic presentation and textual interaction would result in more remote participants utilizing the feedback channels. Custom chat software will be created to allow for a more graphically interesting presentation of the chat. Further, The chat and audio localization features will be integrated into a single interface. The chat will also be modified to give a modicum of spatial control to the participant for presentation of the text.

Technological innovation can be used to create increasingly spectacular events that dominate an audience. However, the same innovations can rehumanize our performances, our interactions and communications – acting as an enabling device – enabling warmer, more authentic, more vital interactions. As Internet researcher Sherry Turkle said, "We are trying to retribalize. And the computer is playing a central role." As we seek a return to the primacy of tribal social structure, we will create new rituals, new shamans, and new beliefs. Technology is a facilitator of this retribalization, and has value as the medium *through which we act*. The computer *is* the new theatre, but humans play the central roles.

1.2 Apotheosis

Many appliances exist that allow persons to manipulate objects remotely—from waldoes that permit a scientist to mix toxic substances or handle radioactive objects in safety, to Ken Goldberg's Telegarden, where a visitor can plant and care for foliage via a web-based interface to the caretaker robot arm. There are also myriad appliances that enhance the perceptual experience of a remote experience. Joseph Nechvatal's exhaustive survey of immersive idioms lists nearly every type of device designed to enhance the illusion of "being there". But, as Eduardo Kac said, "The idea of telepresence as an art medium is not about the technological feat, the amazing sensation of 'being there,' or any practical application the success of which is measured by accomplishing goals. […] I see telepresence art as a means for questioning the unidirectional communication structures that mark both high art (painting, sculpture) and mass media (television, radio)."

To get colloquial, the bloom is off of the rose when it comes to pure virtual reality. I am skeptical of whether the Cartesian mind-body schism ever existed, or if it was simply a philosophical golem created to make telematics more enticing. If there is to be any future for virtual reality, I see it becoming manifest as data space overlaid with actual space. New works illustrate this point: Golan Levin and his team of programmers have recently created Dialtones, a symphony for about 200 cell-phones. In this piece the audience's own phones are registered, given a particular ring tone, and assigned to a specific seat in the hall. The phones are triggered through specially installed cellular telephony relays that permit up to 60 simultaneous active calls within the concert hall <http://www.flong.com/telesymphony/>. Here, Levin is creating an artwork that explores telematics, somatic space and virtually created space. The work is realized by overlaying the virtual space of the interface triggers onto actual space. The *active* elements

of the work reside in the interface that is played by a trained person, and then heard in a "radical surround sound" as the audience's cell phones are triggered to ring.

Other works that deal with merged data-somatic places and/or spaces (as pointed out by Peter Lunenfeld in *Snap to Grid*) are Michael Jantzen's *Malibu Video House,* and Rem Koolhaas' *Maison à Bordeaux*. *Malibu Video House* is a model for a beach home that displays on video monitors, images of the beach that are occluded by the structure of the house – displaying a data-relative space over a physical space. The main feature of the *Maison à Bordeaux* is a hydraulically powered platform that rises through several floors of the center of the house—immediately adjacent to multiple stories of bookshelves. Lunenfeld calls this device a literalized search engine and fetish object. Though today these devices are ethereal, Lunenfeld says, that just as architecture changed with the advent of indoor plumbing, gas and electricity, architecture will change under pressure of technology to accommodate data spaces. Technology is already being slowly folded in to Western life (and public and private space) through wearable and personal devices. Laptops, PDA's, cell phones, pagers are steadily increasing the interpenetration of data space and somatic space. Not only will architecture change; our culture will change to accommodate data created spaces and places overlaid with somatic spaces and places.

In the context of my project, this interpenetration of virtual and somatic space was cast as democratizing, leveling the strict performance hierarchy to create a mutuality of socio-musical interaction. Technological phenomena acted upon cultural phenomena to deconstruct it, examine the meaning of its rituals, and perhaps suggest new directions for those rituals. However, no matter how democratizing a technologically enabled situation may be, it is only enabling for those who have access to it. Technological advance *is decidedly* a Western phenomenon – and contains implicit exclusion of certain cultures. Merging data spaces and somatic spaces can be advantageous, can be a liminal point – altering ritual and meaning in a culture – but only where the technological resources exist

to do this. Kevin Kelley, in *New Rules for the New Economy* says that one fax machine is worthless; the value of fax machines lies in a pervasive network. Similarly, most technological devices are affective only where the devices themselves are present and where the infrastructure exists to support it. Global Positioning System would be of as little use on Mars as a DSL modem would be to someone in the heart of the Amazon jungle.[‡‡] Although a technological advance in one geographic area will create an opposition (the "haves" versus the "have-nots") the lot of the have-nots remains largely unchanged until they come into direct contact with the haves. Technology can fundamentally change cultures, but only if it is *there*. Although simple, this point should not be taken too lightly. The vast majority of the world's population does not have a technologically based society. Today, technology is firmly bound up with Western Colonialist cultures. It is produced by the military-industrial complexes of these cultures, primarily consumed by these cultures, and primarily advantageous to the hegemony of those cultures. Though this is not a call for the implementation of a global technoinfrastructure, to be affective, technology must enter into societies in a *culturally relevant way*. My work, although democratizing, is only relevant within the context of Western technologically-enabled culture. Mutual Assured Deconstruction relates to technology and the symphony, and by proxy to the societies that contain these cultural products. As Joseph Kosuth and Fred Wilson (Godfrey, Tony *Conceptual Art* 1998*)* deconstruct the hegemony of the museum through exercise of curatorial decision so unorthodox that it rises to the level of Art, so MAD deconstructs the performance paradigm through unorthodox viewing/listening/participation schema.

• • •

As far as the execution of my work goes, there are a few aspects that I would like to improve in a future execution. The things I would change in a second performance are

[‡‡] Or Jeff Rutenbeck's neighborhood, for that matter.

refinements of the initial presentation. Primarily these aspects deal with the technological implementation of the representation of presence and extended "virtual cross-pollination" in the somatic space, and the implementation of the interface for the asomatic participants.

First, within the space, I would make available more computers as chat clients. The single most-used path for interaction was a proximate participant interacting with the musicians through the use of the chat space. More terminals for chat clients would make the virtual space more widely accessible by proximate attendees. Second, I think that it would be desirable to have a more direct indication of the presence and location (and perhaps geographical location) of remote participants. In the current implementation, remote participants were visible only if they chose to participate in the chat. I think that some indication of a remote participant that directly marks the somatic space (perhaps a simple light shone on the floor, or projection of the interface on the floor) would enhance the proximate participants' feelings of cohabitation with virtual entities.

As far as issues that dealt with remote participants, the most problematic was the paucity of remote chat participants. The large percentage of remote participants elected not to participate in the chat. Although this behavior is to be expected due to the anonymous nature of remote attendance, I strongly feel that a tighter integration between the sonic presentation and textual interaction would result in more remote participants utilizing the feedback channels. Custom chat software will be created to allow for a more graphically interesting presentation of the chat. Further, The chat and audio localization features will be integrated into a single interface. The chat will also be modified to give a modicum of spatial control to the participant for presentation of the text. The addition of some method by which proximate participants may "mark" the presence of the virtual participants may also enhance the interplay between the spaces.

• • •

If there is anything to be learned about the continual progression of technology and its influence on culture, it is: *plus ça change, plus c'est la même chose.* Apple's introduction of the iMac was a liminal point for computing – where the computer, like so many other technological devices before it, made fully the transition from tool to fetish object. Technologies initiate cultural change, but not necessarily in the way intended. The fetish objects of the printing press, telephone, computer and Internet alter society, not so much by permitting long distance phone calls or e-mail, but more subtly, making our culture to one where the implications of printing, telephony and network computing exist as a part of our social fabric.

In *A Year from Monday* (1967), Cage quotes Zen scholar Dr. D.T. Suzuki:

> Before studying Zen, men are men and mountains are mountains. While studying Zen things become confused: one doesn't know exactly what is what and which is which. After studying Zen, men are men and mountains are mountains… Just the same, only somewhat as though you had your feet a little off the ground.

As I began studying digital media, and became interested in the works that are created utilizing that technology, it began to seem that everything related to everything else. Scripting languages seemed mystically related to the social structures of the culture that produced them. Binary oppositions are perhaps the most favored positions for social, political, moral views (right and wrong, good and bad, Liberal and Conservative…). We have a left hand and a right hand, a "good side" and a "bad side"; we are superficially symmetrical across the sagittal plane. Is it any wonder that we construct the most fundamental language of our computers utilizing these binary oppositions?

Before long, good sense returned, and I became more interested in the affects that technology has upon social constructions. When Adolph Sax invented the saxophone in the mid-1800's there was no musical literature for saxophone players to play. At first, String Quartet music was reworked for Saxophone Quartet (occasionally with rather unpleasant results). It was not until the early 1900's that musical literature was written

with the saxophone in mind. The technology of computing and the Internet is in the former state. We are playing string quartets on our iMacs. In a struggle to understand the functioning and implications of technology, we are perpetually relating it metaphorically back to objects we understand (the trashcan, folders, 3-d virtual space, chat *rooms*…). Technologically created objects and spaces are emphatically *not* these referents. Interacting through a technological medium is a different experience than proximate chatting, yet we call it the same thing. The trashcan, as a metaphor for a set of interface functions, does not precisely jibe with the real-world experience of the trashcan. While creating this work, and doing the research for the technological implementation, I was dogged by the notion that virtually created space must behave like somatic space. It doesn't. Nor does it have to. The hardest thing for me, personally, throughout the course of this study, was to let go of my preconceived "meatspace" notions of how things should work, should be, should exist in a technologically created environment, and how that environment relates to a real-world space. Data space is data space, only somewhat as though you had your feet a little off of the ground.

Appendix A – Performance Instructions

Mutual Assured Deconstruction
by Michael Arnold Mages

Any number of musicians, with any instrumentation may perform this piece, although a minimum of nine musicians is necessary to maintain the sonic texture. Vocalists may be included, and should use vocables, avoiding the use of words or phrases in any language. Electronic instruments and Percussionists may be included. Non-pitched and semi-pitched percussion should play the rhythms as well as the approximate melodic shape of each motive. Instruments can be amplified if necessary. All musicians play from the same sheet of motives.

Motives may be transposed up or down by octaves in order to fit within an instruments' playable range.

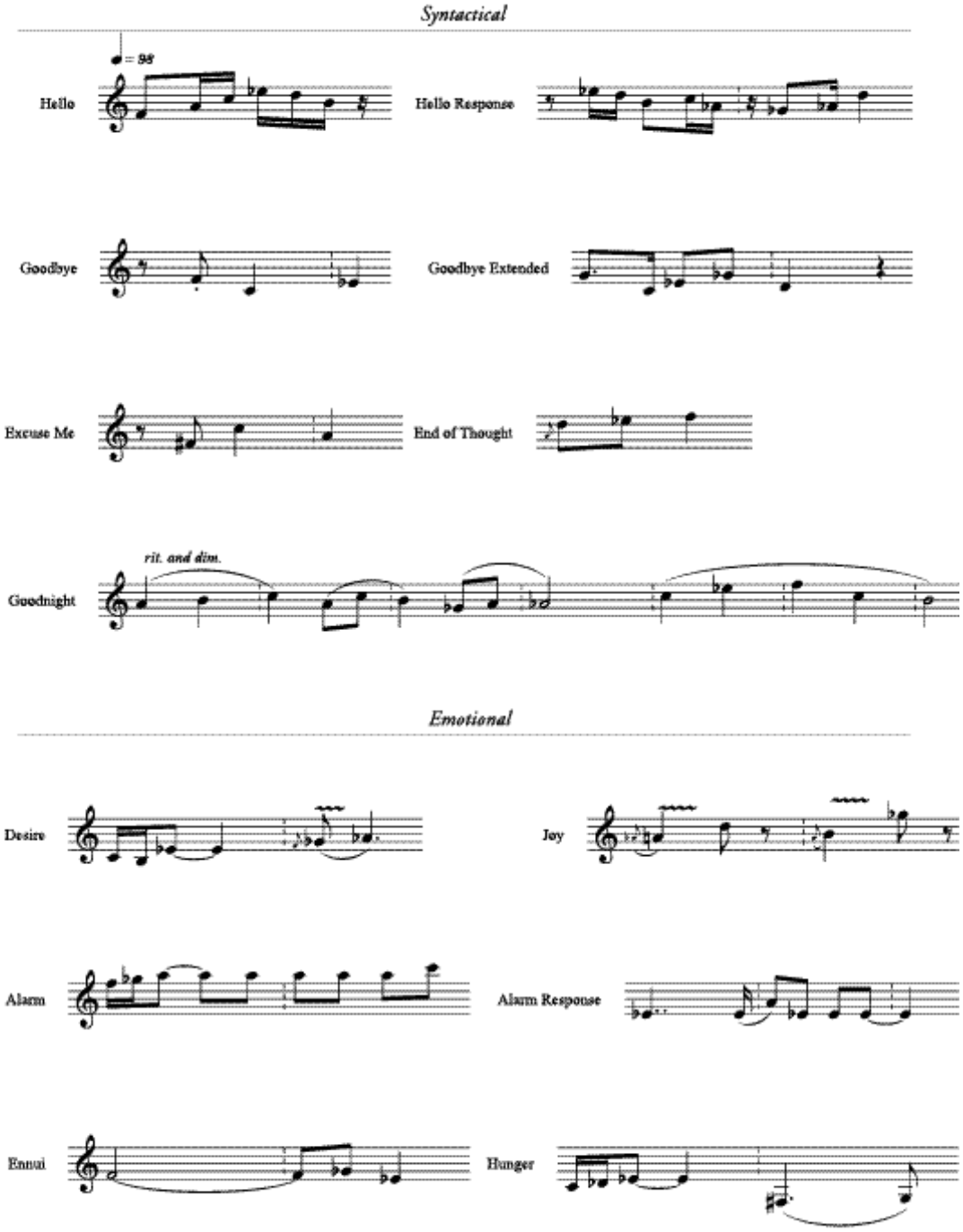
There are three types of motive, syntactical, used to structure communication, emotional, used to express or respond to the expressions of participants, and gestural/responsive, which are direct responses to the actions or spoken words of a participant. Motives are played in response to the actions of the attendees, both actual and virtual. Motives denoted as "response" are played only in reaction to the corresponding motive. For example, if the Alarm motive is played, all the players hearing that motive should, at the conclusion of whatever motive they are playing, immediately switch to playing the Alarm Response motive.

Players should consider the event a social occasion, rather than a performance occasion. The goal of the work is to initiate musical-interactive conversations with all participants. Therefore the motives, as provided, are to be considered by the players to be like written words. Players are free to *speak* each motive with articulations that they might consider using in everyday conversational speech. Motives should *not* be played in forced unison throughout the entire ensemble, but should always remain free to interpenetrate and overlap as chance dictates. As in a social situation, players are free to enter or leave the space, and may occasionally drop out to rest or listen to the quality of the texture.

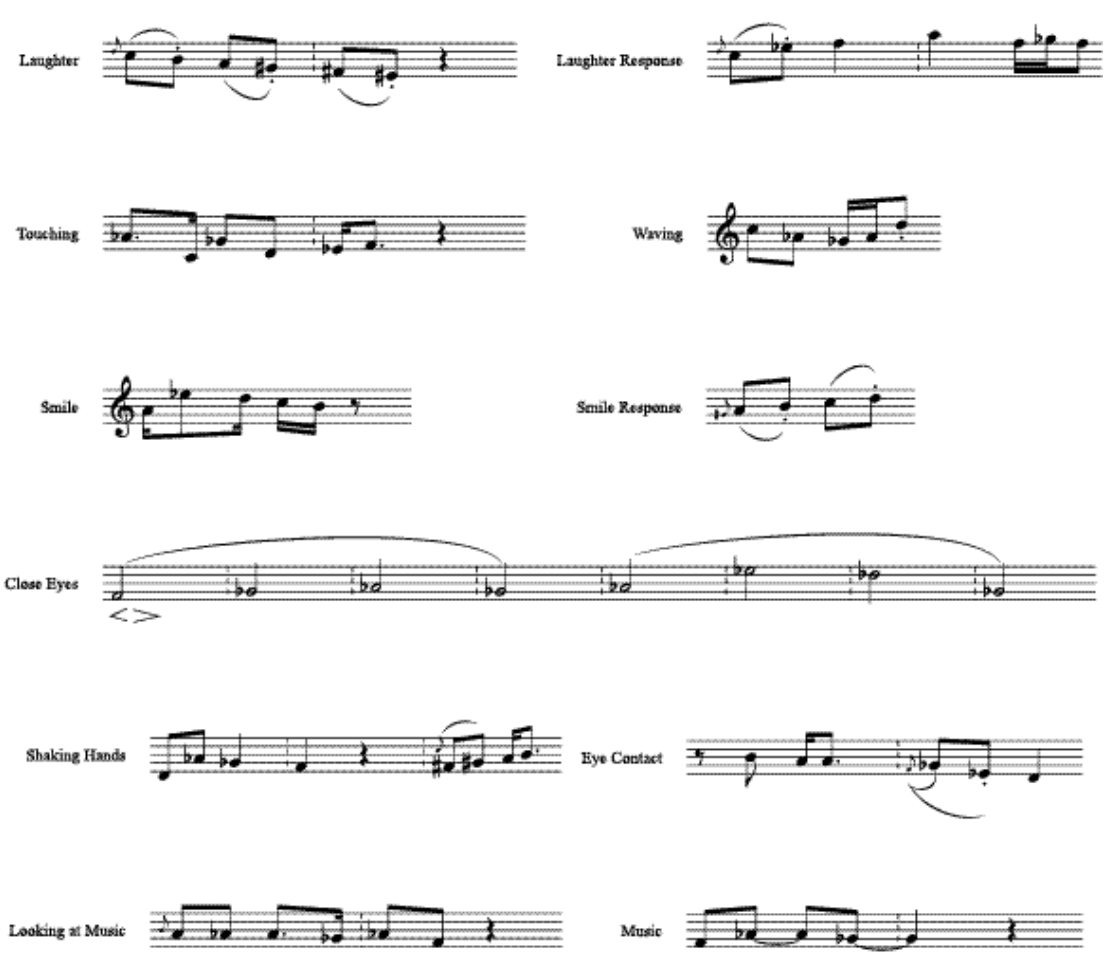
The event may take place in any type of space that does not impose hierarchical constraints upon interactions between players and participants. (I.e. players should not be on elevated platforms, or otherwise separated from the participants, and the area should not be structured with partitions or other objects that divide the space.) Each player should choose an area within the space that will be his or her *sphere of influence* for musical interactions. Each player should be sure to include the virtual attendees in their sphere as well. Players should attempt to interact with all who enter their sphere, though, as in any social situation, some interactions may be more interesting and desirable than others.

The piece is ended at a prearranged time, when musicians will begin playing the Goodnight motive (as before, unison playing should be avoided). When everyone in the room is playing the motive, the piece may be ended by a signal from one of the players.

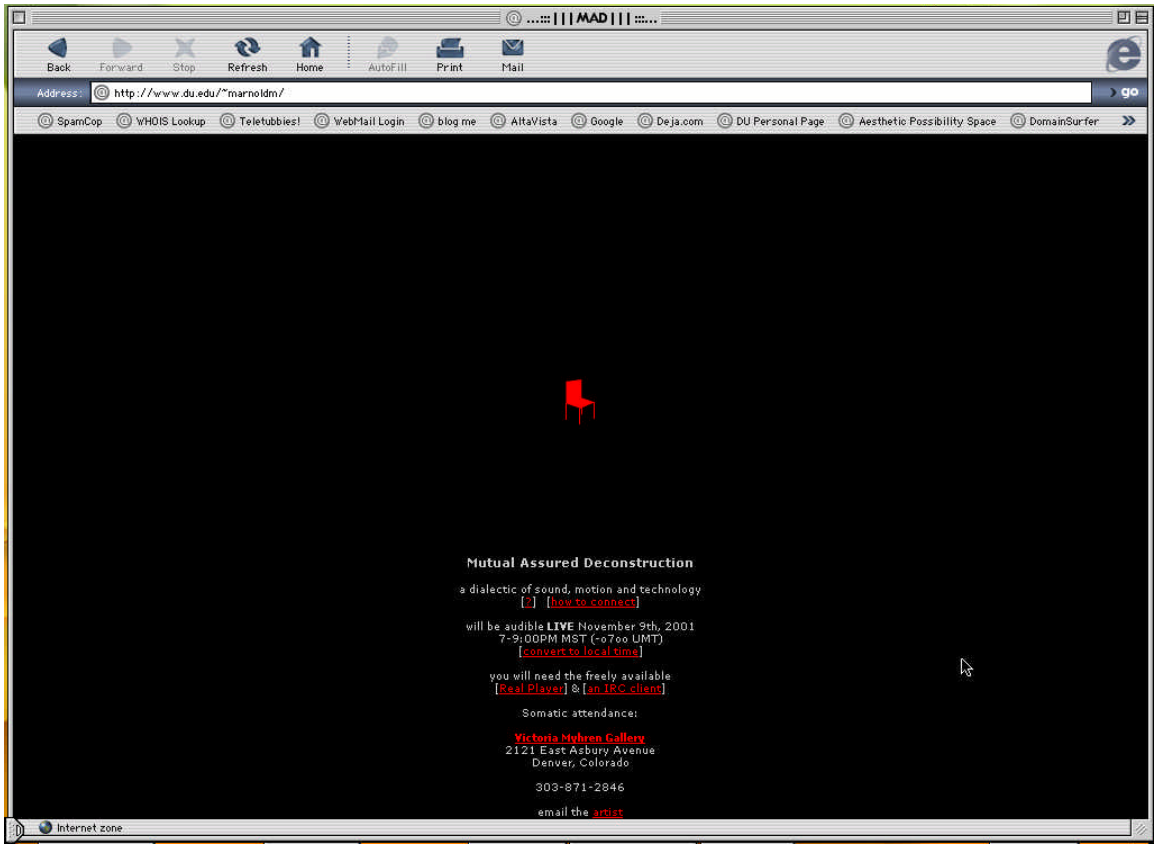
Appendix B – Leitmotivs



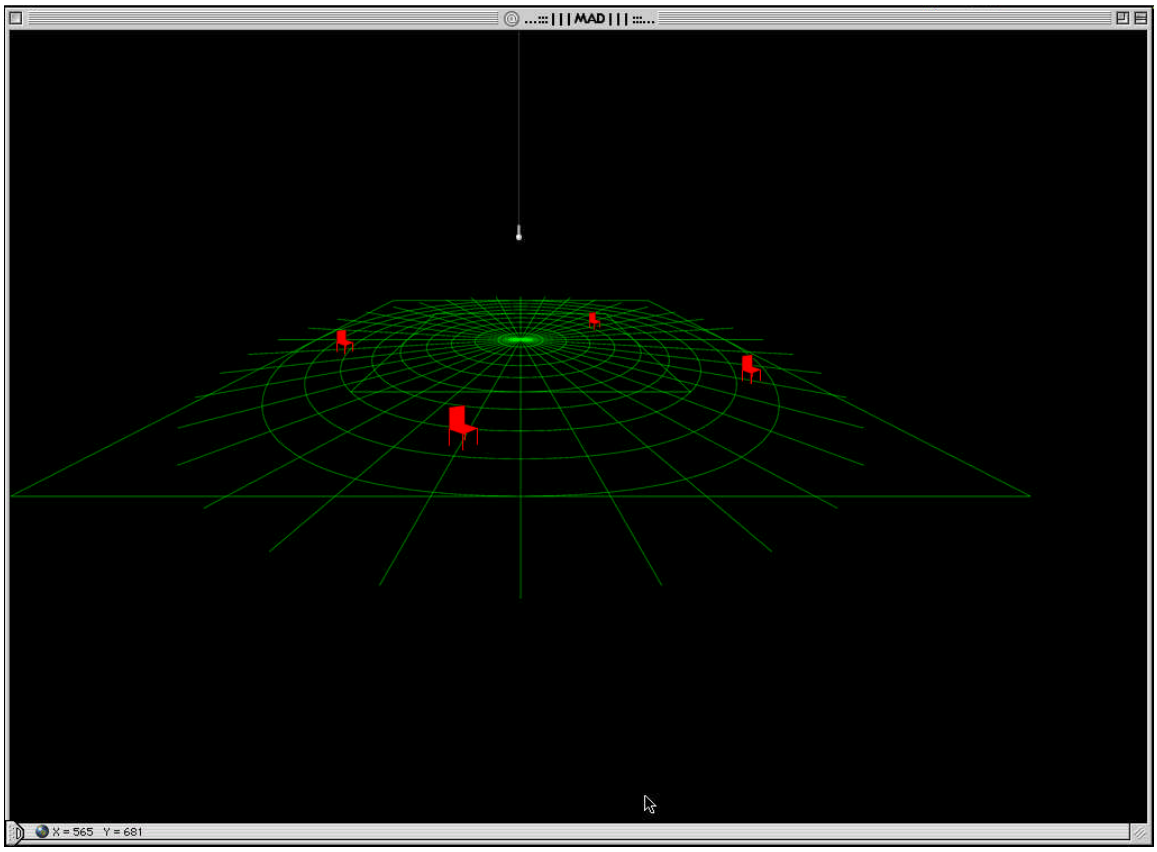
Gestural/Responsive



Appendix C – Interface Graphics

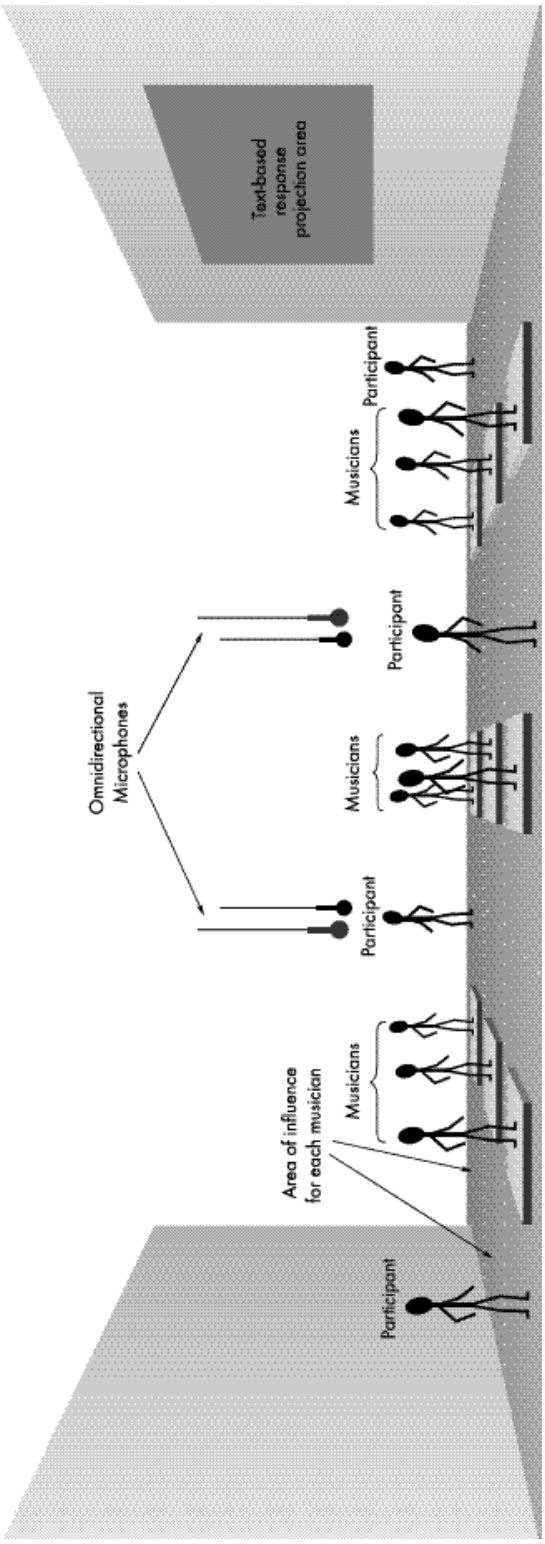


Entry Page



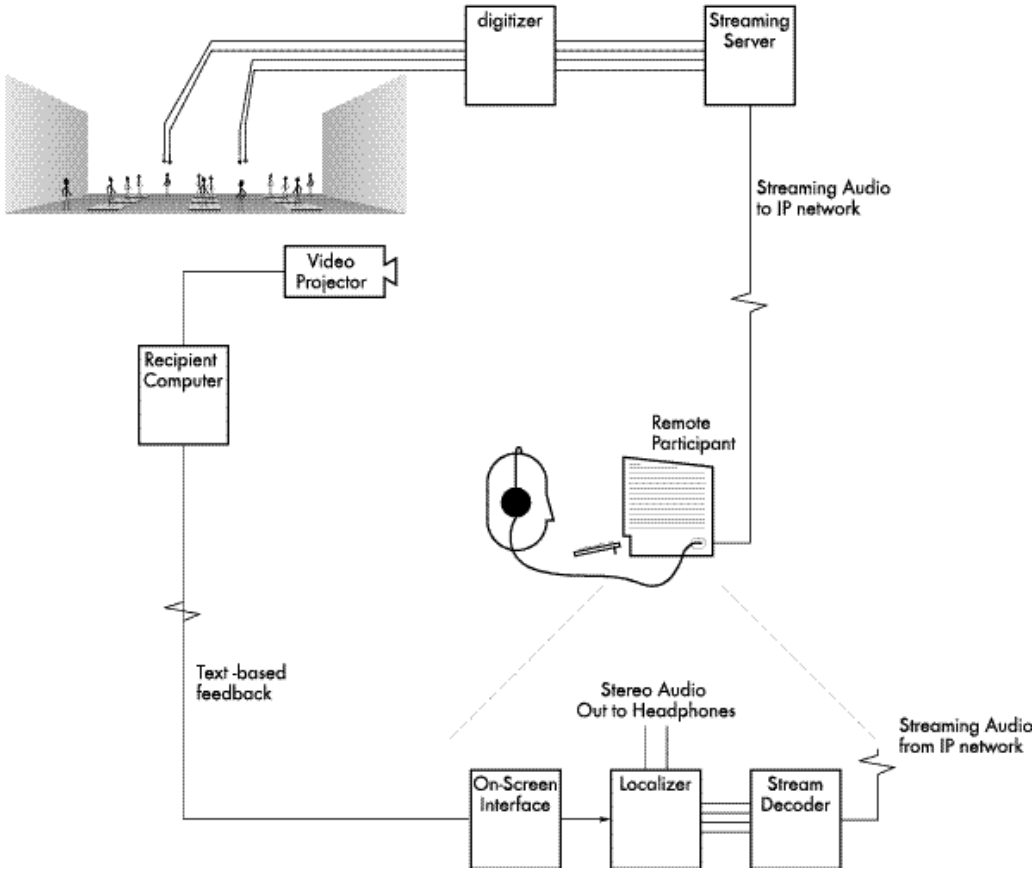
Spatial Interface

Appendix D – Performance Diagram



Room Layout

Appendix E – Network Diagram



Network Transmission Diagram

Conceptual/Visual Research Resources

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