**Sensuous Geographies - a multi-user interactive/responsive installation**

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**Abstract**

This paper will discuss key issues which arose during the creation of *Sensuous Geographies*, a multi-user interactive/responsive installation created in 2003/4. In particular it will refer to the way in which the design of the installation was intended to draw attention to bodily sensation, facilitate collaborative interactivity between participants and bring about an emergent choreography, and to the collaborative methodology used in developing this work.

**Introduction**

*Sensuous Geographies* is an immersive, multi-user interactive installation, created by composer Alistair MacDonald and choreographer Sarah Rubidge. It emerged from a research project, undertaken under the auspices of Sarah Rubidge’s AHRB Research Fellowship, which focused on the development of a multi-user interactive environment which was both legible to the user and complex enough to be artistically interesting in its own right, and MacDonald’s Creative Scotland Award, which is awarded to artists in Scotland to advance their practice into new domains. In this project the artists’ intentions expanded to include the notion that the installation would draw the attention of participants to bodily sensation, and use that awareness to guide movement behaviour, facilitate collaborative interactivity between participants and to bring about not only emergent sound worlds, but also an emergent choreographic form. It also became both a space for play, and a meditative, sometimes almost ritual space, in which the barriers between the audience and the artwork are dissolved.

Another feature of the installation is that it is designed not only to allow participants to engage interactively with the installation (in a central, electronically sensitised space, some 5x5m), but also encourages participants to watch the activity of others as they do so. In doing this it challenges the roles of audience and participant in such installations.

*Sensuous Geographies* is set in a large space (minimum of 10x10m) hung with translucent banners, on which liminal video images are projected. Predominantly a sound installation, it comprises a collection of rich polyphonic sound worlds, made up of
independent strands of sound which are activated by the participants. The sound worlds differ from moment to moment, and come to being through the actions of its visitors – the public. As they enter the central interactive space visitors trigger individual strands of sound. As they move around the inner installation space they also influence the quality of their sound strand and consequently the overall texture of the sound environment. At the same time through the use of highly processed responsive video imagery, shadowy virtual counterparts of the visitors themselves are brought to presence, projected onto the banners floating in and out of vision.

Several issues arose during the development of this installation. Within the context of the overarching desire to design an interactive/responsive multi-user interface which would facilitate cooperative interactivity amongst the participants, each of the artists had particular goals in mind which were influenced by their particular artistic backgrounds.

Two central goals began to guide the choreographer. The first was to create a multi-user interactive installation which would generate emergent choreographic forms during its use. The second was to develop an installation in which the behaviours of participants would be guided not through conscious intentions or thought but through ‘subconscious’ physiological messages initiated by subtle sensory perceptions of the environment. In this Rubidge was exploring the notions of scientists such as J.J. Gibson, who understand perception to be a network of perceptual systems, including ‘unconscious’ systems (which he places under the group he terms the ‘haptic’ perceptual system). These systems are not independent, but interact with, and modulate, each other. The composer, Macdonald’s guiding intentions were less to do with the body and more to do with creating a complex musical environment each manifestation of which would be brought to life and given a distinctive character by the activities of the participants. He uses the term ‘musical environment’, rather than musical instrument, advisedly on the grounds that this environment is composed of pre-selected musical sound when activated, rather than creating sound from its structure.

These two sets of goals imply that the two artists were working towards providing the conditions to facilitate particular, but different, kinds of experience when they started work on the project. Although the two sets of goals remained distinctive throughout the development of the environment, they interpenetrated throughout the working process, modulating each other as they developed. The result is a work which has a richness of texture that perhaps would not have been generated had each artist focused on only their own set of goals.

Sensuous Geographies itself is an interactive sound installation in which individual participants initiate and control strands of sound independently of each other, but in which the composite spatial behaviours of two, three or four of the participants (e.g. the degree of proximity between participants a & b , or a & c, or d , b & a) also serve as a parameters for the modulation of the sound environment.

Rubidge had explored the notion of multi-user installations in earlier works, but using visual imagery rather than sound as the primary interface (e.g. Passing Phases (1996-
She had also been exploring the introduction of the sensuous to the digital domain, and the use of this to affect behaviour. She observed that, when these pieces were engaged with by the general public, the visual images, which were unashamedly representational, seemed to encourage the viewer to use their minds, that is to let their conscious intentions guide their behaviour, rather than to use the sensations the images generated in their bodies to initiate their responses.

A further feature of these installations was that the tracking systems used, which used linked pressure pads (Passing Phases) and camera tracking (Halo), did not individuate the participants. The latter were identified by both tracking systems as one of many un-individuated ‘objects’ which changed location in the space. The system could ‘lose’ the ‘identity’ of individual participants under certain circumstances (e.g. through occlusion), and make an arbitrary decision as to the ‘identity’ of a tracked object. Another issue which arose involved the effect of increasing numbers of participants on the legibility to the participant of their behaviour in the installation. In Passing Phases, in which the numbers were not limited, if there were more than four people in the space, participants could not discern which of the installation’s responses they were initiating as an individual. (Passing Phases comprised a set of seven computer monitors set in a circle, on which close-up images of parts of the body were displayed. It was intended that the participants would affect the display on the individual screens through their collective behaviour). In Halo, under similar conditions, although the behaviour of the participants and the behaviour of the individual images on the screen (each of which was independently interactive) were legible, and controllable, when there were less than 6 people in the installation, the participants often lost control over the images they thought they were controlling when more visitors entered the interactive space. Rather, the images on the screen appeared to the participants to be engaging in random behaviours which had little to do with the individual participant’s behaviour.

The research project which resulted in Sensuous Geographies was in part intended to address both of the issues mentioned above, that is legibility of the interface and the use of the sensory systems as the main interface with the environment. In order to overcome the tendency of visual images to activate the conscious intentions of the participants, and to redirect participants attention to bodily responses, it was decided by MacDonald and Rubidge to use spatialised sound as the main impetus for the navigation system in this research project, on the grounds that sound has the capacity to affect the body at a deep physiological level, as well as to exercise the conscious mind. Although a great deal of theoretical investigation has taken place with respect to the notion that the power of sound can affect the physiological sense of being, and subsequently behaviour, of the participant, the impetus for Sensuous Geographies came from an understanding which has been developed by both choreographer and composer through their creative work rather than from any theoretical standpoint. Later readings (Rodaway, 1994; Gibson 1966; Damasio 2001) supported this artistic intuition, and provided a theoretical underpinning for the work. The work itself, however, was developed from an intuitive standpoint from its inception.

In order to address the issues concerning the need to individuate each participant, so as to
increase the legibility of the interface, and thus the ability of the participant to understand what effect they were having on the sonic environment, it was necessary to develop a multi-user interface which could track each participant independently, without losing ‘sight’ of them. This is a necessary condition for co-operative interactivity as it allows the participants to have some idea of the effect they are having on the environment, and thus of the general nature of their relationship to the installation, and to each other. It also allows for more sophisticated initiators of modulations to be used than one-one responsiveness (e.g. proximity between two or more people a & b affecting the sound environment in one way, proximity between a different grouping of people, a/b/c, affecting the sound environment in another way).

From Alistair MacDonald’s earliest works such as *Stiriae* (1984) and *(inter)play* (1987) space has been an important consideration as a structuring parameter in composition and performance, and as his works have gradually incorporated more recognisable real-world (as opposed to abstracted “pure” musical) sound, this concern with the nature and perception of space has developed to incorporate more consciously developed sonic environments. *The tincture of physical things* (2000), for example, uses only (transformed and raw) environmental sound sources and is structured entirely around transformations between a number of imaginary spaces and contrasts between spatial behaviours and densities. In addition, his understanding of the articulation of space has been developed through long experience of performance and sound diffusion of electroacoustic music in the UK and continental Europe with Birmingham ElectroAcoustic Sound theatre (BEAST).

It can be argued that much electroacoustic music does not require a specialised or sophisticated musical mode of listening as it draws not so much on a learned musical language, but on our subconscious decoding of sound based in our relationship to the physical, sounding world. As Trevor Wishart maintains (Wishart 1985:70), we are able to know much about a sound without seeing its source: we understand instinctively the apparent physicality of the gesture used to create a sound, even if the sound is unfamiliar, and our decoding of apparent spatial locations and behaviours of sounds (relative to the listener) tells us much about the energy present in a sound making object, the material, size and shape of the space in which the sound appears to occur, and our proximity to the periphery of the space. Composers in this medium are therefore able to use this innate understanding to create musical meaning & structure which is often more universally accessible than instrumental music. This can be seen in the work of many, particularly European, composers for example with Trevor Wishart himself in his use of recognisable environmental sound (*Red Bird* (1977), *Vox 5* (1986)) and Denis Smalley in his abstracted landscapes (*Pentes* (1974), *Valley Flow* (1992)).

MacDonald designed and built the interactive system which drove the work (using Max/MSP), and, over time, created the matrix of musical environments which participants access and transform as they engage with the installation. However, the particularity of both the installation environment and the interactive interface, and the nature of the participants’ interactive engagement with that interface were developed in
conjunction with the choreographic needs Rubidge brought to the installation. These included the desire to have the participants be guided by the sense the sound environment generated in their bodies (for example the sound is such that you “lean” into it and let that physical response move you in a particular direction, and at a particular speed), and the desire to see a genuinely emergent choreographic form develop as individual participants move around with their sounds, or luxuriate in the particular sound environment they generate. In order to encourage participants to really engage in their sensory responses to the environment they are blindfolded as they entered the active space. This requires that they attend to those details of the environment of which they may not be aware when able to see the space around them, in particular the precise placement of the sounds in the space in relation to their own body, the feeling the sound generated in their bodies, the actions that feeling precipitated, and the proximity of sounds other than their own to their own location.

In choosing materials for Sensuous Geographies, then, MacDonald drew upon categories of sounds, developed through his previous work, which have immediate physical, that is physiological, resonances for any listener (as well as sociological and aesthetic responses relating to the apparent identity of the sound), and the idea, refined during the process of developing the work, that in “owning” a particular sound, participants tend to empathise with it and share some of its energy. The particular choice of these sounds in combination from moment to moment is a musical/compositional decision made by the composer as each new participant enters the space in order to offer an ever evolving musical landscape, thus fulfilling both musical and choreographic needs.

In addition to the individual participants’ strands of sound there are contextual layers – sounds which fill the whole room and create a (changing) sense of the environment within which the independent sounds operate. For example, a contextual layer of an untreated recording of a quiet outdoor landscape encourages participants to move very freely and naturally; a low, dense, static drone usually slows participants’ movement, many of whom will move closer to the floor; higher cracking sounds induce an increased tendency towards energetic movement. These sounds colour participants’ physical reactions to the environment as a whole, and change the perception of the individual strands of sound for both listeners and active participants. As a result participants who become comfortable in the installation clearly appear (and claim) to bypass a conscious reaction to the sound environments created by the system, and thus their desire to control the environment, and to open the way for a subconscious collective approach to the generation of the sonic environment. It is here that the feedback from system to participant and participant to system is generated, not in any specifically computer driven system. The latter, along with the choice of sounds, sets the conditions for the feedback between environment and participants to occur.

The design of the interface used choreographic understandings concerning the use of space as a means of rationalising some of the parameters for modulating the sound, for example proxemics, as a means of creating dynamic, fluid group formations, the sound tracking the location of the participant in space (“proxemics” was coined and is defined
by Edward Hall as the “perception and use of space” (Hall 1968:83)). This facilitated the development of emergent choreographic (spatial) forms as the participants interacted with the environment. Both in the research and development stages and in public presentation it was noted that different participants responded in different ways. Musicians and composers would often try, initially, to create a musical event as they engaged with the environment. Others would simply explore and savour the sound world they found themselves creating. Some would combine the two. There was room for all these responses, and more, in the environment. Equally there was room for ‘novice’ responses and more ‘expert’ responses. What became apparent was that the more time participants spent in the installation the more sophisticated their responses became, with many participants returning to the installation several times within a single visit and some came on more one evening.

The manipulation of the environment became more expert both with respect to the individual as individual and as a member of a group, and the texture of the environment being produced concomitantly more complex. This was in part due to the richness of the sound environments the participants found themselves initiating. In the final analysis the interface of Sensuous Geographies proved to be accessible to, and usable by, participants from a wide range of backgrounds, and generated a wide variety of coherent interactive group responses from different groups of people. Musicians, composers, dancers and choreographers, American football and basketball players, senior citizens and small children all found their own way to respond to and engage with the installation. (Of course, not all participants found it easy on the first encounter, however most persevered through the initial period of confusion to find their own intuitive response to the sound environments they were experiencing.)

In order to ensure that the work retained its interest for more ‘experienced’ participants, the interactive system has a number of levels of complexity from ‘novice’ to ‘expert’. At its simplest, a ‘novice’ visitor’s sound will follow him/her around the space. As complexity increases parameters such as pitch and volume, or more radical dynamic transformations of the sound will result from speed of movement, position or proximity to other visitors, and these relationships between visitor behaviour and transformation will change each time one enters the space. The balance between legibility/predictability and complexity is designed to keep visitors engaged even after many visits. The most complex ‘expert’ levels are sometimes impossible to read, but when a user reaches this level it is an intuitive understanding of the installation environment, not a conscious navigation of their role which engages them. Thus an ‘expert’ has not learned a technical facility, but a mode of ‘listening with the body’.

The methodology used during this project comprised a cyclical flow between
a) long discussions concerning the generalised effects desired, both from the perspective of the musical interface and the behaviour of the participants who generated the musical event,
b) building the software interface,
c) testing the efficacy of the tracking system (video camera and colour recognition software),
d) testing the legibility of the interface, the effect of the interface and sound environment on participants, and their effect on the installation,
e) evaluating the responses of both the interface and the participants and reconsidering the structure and content of the work in the light of this.

This cycle was undertaken three times prior to the first public showing, leading to development and refinement of the interface and musical content. Approximately 40 people were invited to take part and contribute to this process over the three periods, comprising dancers, composers, musicians, actors, performance artists, architects, theorists and others with a range of experience of interactive work. The introduction of the contextual layer of sound, and the use of blindfolds are just two examples of aspects which came about directly as a result of feedback from participants in the development stage. The piece was mounted for the first time in February 2003 (2) and the responses to this were used to further modify the interface and environment for future events.

At the time the project was initiated the only practical tracking system accessible by the team which would uniquely identify individuals involved video camera and colour recognition software. The restrictions imposed by this system significantly influenced the visual appearance of the installation environment as participants have to be identified by clearly differentiated colours, and testing determined that these would need to be bright red, yellow, green and blue. In order to facilitate this there were a number of options. As the video camera used for tracking was overhead (to minimise occlusion of one participant by another) it was decided that participants would be dressed in costumes covering the whole body and head in order to be permitted to enter the active space. Designer, Margaret Moffatt, was commissioned to create costumes which could be worn by people of any size and of any gender. Two sets of costumes were created to accommodate (and denote) both novices and expert users which ultimately provided the installation its visual character and ambience. The costumes are opulent, richly coloured, and quite un-technological in appearance. They also proved to have another function, serving as masks, giving participants a sense of anonymity and the freedom to behave in a way they would not have behaved had they been in everyday clothes. The donning of the costumes also serves as a threshold between the everyday world and the world of the installation, inasmuch as the process of putting on a costume, and facial mask, gives the event in which they are involved a sense of ritual.

An interesting offshoot of the installation also occurred, and was later taken up by Dr Chris Creed, a social psychologist from Portsmouth University. Creed attended the first showing of Sensuous Geographies in Glasgow. In addition to his own personal experience of the installation, he noted that the installation had encouraged a level of social engagement both inside and outside of the installation environment that was unusual amongst strangers. The installation tended to make people want to work together in the installation and, after they had emerged from, it to talk with each other about the nature of their personal experiences within the installation. These conversations often led to people going back into the installation together to explore new ways of responding to the space. Some participants came back on succeeding days to re-experience the installation. Other participants found that the physiological, and psychological, effects
engendered by the installation lasted well into the next day, modifying their ways of being in the world outside to an extent neither they, nor we, had expected. Creed since revisited the installation, interviewing participants, and presented his reflections on the comments made by participants at a Symposium, entitled Choreographic Installations, an Emerging from of Choreographic Practice, held at the University College Chichester, June 2004.

The collaborative methodology used to develop *Sensuous Geographies* was grounded in a long-term artistic relationship between MacDonald and Rubidge. Both have had long experience of working in collaboration with choreographers and composers respectively, although they have only made one professional work together. However, they have, over the years, investigated a range of collaborative processes between composer and choreographer, and conducted cross-art workshops for both students and professional artists. This experience, when applied to the collaboration on *Sensuous Geographies* allowed them to work intuitively across their respective fields, to ‘read’ potential extensions of each others’ working practices in this new context, to accommodate ideas which may at first have seemed counterintuitive to one or other artist, and to experiment with new ways of approaching their work. However, here the collaborative process was also extended to include contributions from participants, whose comments and physical responses to *Sensuous Geographies* continue to affect the growth of the installation from presentation to presentation.

References:


Other works by the authors referenced in the text:
Sarah Rubidge, Simon Biggs and Stuart Jones, (1998) *Halo* (Interactive installation) and *Halo...in Performance* (Interactive Performance Work) Harewood House, Yorkshire and Fabrica Gallery, Brighton


Alistair MacDonald (2000) *The tincture of physical things* (electroacoustic music)
Alistair MacDonald (1987) *(inter)play* (electroacoustic music)
Alistair MacDonald (1984) *Stiriae* (electroacoustic music)