David Cunningham AHRB proposal

Activated Space - the transformation of internal spaces to become audible and interactive.

Activated Space is a proposal to develop and present a series of installations that alter an architectural space to allow its resonant frequencies to become audible and interactive. The proposal combines elements from sculpture, electronic media, music, architecture and acoustics.

research programme:

research questions:

Primary:
How can active listening be encouraged?
How does our awareness of acoustic surroundings influence our perceptions?
What happens if you magnify the sound of a room?

Secondary:
Why is the role of sound increasingly coming to the fore within the Fine Arts?
How does technological change cause perceptual shifts which generate new potentials for awareness both inside an art/music context and generally?

aims and objectives:

To foreground and reveal how the spatial elements of sound contribute to the conditioning of human activity. To investigate what happens if you magnify the sound of the room. To expose the nature of hearing, how to a very precise degree we are subconsciously constantly aware of our immediate acoustic environment.

As a sustained attempt to produce and monitor this work, one distinctive feature will be to maintain an online diary of the creation and duration of each component installation open to the interactive scrutiny of peers (See Appendix 2). This electronic resource will be complemented by my own published texts both online and in other media, continuing a discussion of the research questions above and a parallel investigation of the documentation of such experiential work.

To place this investigation within the related concerns of the Newcastle University Fine Art and Music Departments and exhibition within the established regional context of innovative time-based work eg: the development of the New Media Centre at the Baltic Centre and the work of Locus+.

research context:

This work is entirely dependent on real-time activities, taking the sounds in a space and allowing people within that space to hear the space in a qualitatively different way, to begin to listen actively.

This series of works could be considered to be architectural or sculptural in the sense that there is a consistent structure moderated by external factors. Formally it is situated within the practice of Fine Art, a minimal aesthetic with much concern for the materials and structures, an open or experimental situation within which the viewer/listener is an essential component.

The installations have a musical function and unlike much other time-based work are responsive to musicological analysis, creating a slowly shifting series of chords based on a fundamental which is always a resonant frequency or a harmonic of the space. Possible developments involve the creation of an active acoustic environment for music performance, an interactive harmonic environment which is quite different in nature to conventional reverberation or echo.

Amplified sound surrounds us constantly, increasingly employed by industrial and commercial concerns, often in inverse relationship to any value to be derived from that sound and to the detriment of any idea of an aural ecology.

New technologies of reproduced surround sound are emerging and these technological shifts generally alter listening habits. This research is concerned with individual perception of acoustic space and builds on these perceptual shifts to emphasize potentials for awareness that may well become relevant outside an art/music context in the near future.

I am not aware of other research in this specific area elsewhere. Technologies of amplified and reproduced sound are industry-driven and are diametrically opposed to my concerns of observation, of listening and valuing the acoustic space inhabited by an individual. My concern is shared by the Swiss-based World Soundscape Project - their output (mostly documentation of an ecology of sound) provides support for an implicit ideological position rather than practical or technical comparison.

research methods:

The methodologies of this work combine those of an interdisciplinary practice of experimental music/ sound/sculpture/time-based art within a Fine Art tradition and those of professional music/sound production. These processes are grounded in many years experience of creative work, both commercially and artistically.

The process of development is integral to and directs the work towards a final structure.

The working procedure will be to initiate installations in a range of spaces amplifying the sound of those spaces in accordance with their inherent acoustic properties of reflections and standing waves. Various techniques are employed to allow the resonant frequencies of a room to become highly audible in real time (See Appendix - Installation Technologies). This process is modulated by very slight acoustic changes as people move around the room, by ambient sound, by humidity, by the movement of air.

A parallel and complementary component of this research will consider the placement of the viewer in physical, perceptual and critical relation to the work.

Exploration of an acoustic is by its very nature site specific and one key element is to use as many sites and situations as possible developing, documenting and refining the project throughout the duration of the Fellowship. The main criterion for the selection of installation sites is the specific acoustic offered by each space. There are a number of practical secondary factors, access, invigilation, power supply and so on.

Development of these research stages and methodologies will be documented (see Appendix 2) and made available on a continuing basis throughout the project in order to reveal how this specific research process leads to the expansion of the research questions above.

ii - research dissemination:

The prime output will be a series of installations to be developed and presented in a series of locations - gallery spaces, disused buildings, public spaces. This will be monitored and supported by an online diary of the creation and the duration of each installation and complemented by online discussion as the work emerges. There will be continuing documentation of each stage of the process.

Documentation of such site-specific work with its implicit focus on the real-time presence of the viewer/ listener within the active installation presents significant problems and a continuous aspect of the programme is to actively investigate appropriate recording techniques within the spaces created (see Appendix 2) which will be referenced and annotated within the online diary.

Year One - Initiation of the website and online diary. Installations within the Fine Art Department exploring variants of the work with existing spaces and experimentally trying alternatives to the basic technology. Exploration of the spatial variants introduced by the reflective qualities of different spaces, in particular arches, vaults and domes, using the variety of architecture within the University.

This ongoing work will be offered to musicians within the Music Department to begin to formulate strategies for performance within the installation - performer(s) using enhanced room acoustics as a musical component. Refinement of the technologies over the period of the Fellowship would suggest the parallel development of a formal compositional approach to the musicological aspect of the work. Involvement with the Department of Music at Newcastle is an obvious step and the Department's response has been positive.

Year Two - A formal presentation of the work in a public space in the Newcastle area; continuing development of technical aspects of the work eg: computer control of amplification and spatial diffusion. Collation and formal documentation of work to date including recordings in DVD 5.1 audio format.

Year Three - Extrapolation of the key innovations developed through the Fellowship into a series of public installations, the precise nature dependent on the way the research has led the work, but the aim is to incorporate a public space, a formal gallery space and a performance space.

Collation and publication of documentation of the installations and indexed online archive.

Throughout the Fellowship I expect to continue to exhibit variants of this work outside Newcastle and internationally which will incorporate research developments and provide feedback.

iii - career development:

My career has been based on work with music and sound in a variety of contexts: performer, producer and recording artist, gallery installation works with sound and writing for a number of art and music-related publications. Other work has included technical consultancy, assistance and collaboration with artists' sound installations, video and film. I have lectured on sound within many Fine Art departments working with students from BA to PhD level; this has involved practical studio tutorials, workshops and thesis supervision.

Commercial recording work alongside part-time teaching has funded my own research to date but to move the project forward will entail a sustained period of development, access to University facilities and the opportunity to engage with experts in complementary fields such as musicology, acoustics, linguistics, architecture, perceptual psychology and neurology alongside a continuing dialogue within Fine Art. The Fellowship is a release from the demands of work within the commercial domain, enabling a significant enhancement of the scale and pace of my research interests.

Facilities provided by the University and the Newcastle area in general:
Locations for work - Newcastle's history of innovative time-based exhibition, and the city's architectural and economic past has created a significant number of possible locations for this work including locations within the University for controlled test work. The University's Music Department and Computer Centre (See Appendix 2) will provide essential support.

The University Staff Development Unit offers a Postgraduate Certificate in Research Management which will be valuable to the progress and dissemination of this work.

To an independent practitioner like myself people are the most significant resource. The University environment offers audience, helpers, collaborators, critics and the inevitable mixture of all of these.

iv - contribution to the institution's research environment and culture

1 - Teaching, in the broadest sense
Sound has played a significant part in art practice over much of the last century, from Dada to contemporary work, in particular artists' involvement in time-based media without there being any formal provision within most Fine Art Departments of specific expertise, practical or theoretical. Within Newcastle I intend to offer a series of seminars and workshops with staff and students to explore and develop the role of sound within Fine Art

2 - Presentations within the Institution
Installations within the University will provide a basis for workshop activity with students and as an introduction to the principles of the work for interested parties from elsewhere in the University, thereafter to refine and develop the work expanding the principles outlined above.

My initial intention is to use the installation space to encourage interdisciplinary meeting and activities with students and staff from several departments to discover and discuss areas of overlapping interest and to generate collaborative and cross-disciplinary work. This discussion will extend to the online website.

Coming, in part, from a music background, collaboration is normal within my work. Newcastle is one of the few British Universities offering the disciplines of Fine Art, Architecture and Music and it is my intention to take full advantage of the possibilities of cross-disciplinary collaboration, in particular the electronic interface with time-based work being developed by current Fine Art AHRB Fellow Monica Ross.

APPENDIX - Installation Technologies:

The basic system components of the installations are a microphone connected to a noise gate (in principle a switch which activates according to the volume of sound passing through it), amplifier and speakers in a highly reverberant room. The system is arranged in such a way that when the microphone and loudspeaker begin to feed back the amplitude of the sound causes the noise gate to cut off the signal. The feedback notes resonate through the space accentuated by the reverberation time of the space. As the sound falls below the threshold of the noise gate the system switches back on and the process continues.

The available pitches of the sound are primarily determined by the distance between the wall, floor and ceiling surfaces in the space, and by the location of microphone(s) and loudspeaker(s); by the time it takes a sound to travel and be reflected in three dimensions; not a simple equation. Microphones are Pressure Zone type to enable the plane of a room surface to act microphonically.

It has been my intention to keep the technology involved in these installations minimal and comprehensible to the viewer. This does not preclude future developments with alternative technology, in particular the development of a software-controlled version of the installation.

For other software-related developments see Appendix 2, the electronic resource.

appendix 2 - electronic resource

1 - project management

As described in the Research Proposal at the outset of the Fellowship a website will go live. This will be primarily text-based and include a response section to progress and facilitate the online discussion. The site will be updated and archived as each installation project is initiated and as the online discussion develops.

Through developments in data compression the ability of Internet media to carry moving image and audio is likely to advance over the duration of the Fellowship so specific website software suggested here will be updated to accommodate audio-visual material where appropriate.

All documentation, archive files and backup data of the research and its outcomes will be collated as described in section 4 of this Appendix and deposited with the AHDS.

David Cunningham will be responsible for project management in liaison with the Head of Fine Art Andrew Burton, the Research Mentor Susan Hiller, The University Research Unit, Computer and Audio-Visual Centres, technical staff, external consultants and curators. The Research Unit provides administrative support, expertise, advice on budgeting and seeking any necessary further funding and further training in research management.

2 - data development methods

The substantial body of content will be developed and derived from original artworks and no issues of copyright infringement are involved. The copyrights of third party contributors within the work will reside with the performers with a clearance granted in each individual case for open access for educational and academic use.

The draft clearance wording is as follows:
With regard to my copyrights embodied in my composition/performance (insert title, date and location) I confirm that I allow permission for open access to the recording(s) for educational and academic use without prejudice to my rights to negotiate freely in respect of any other uses.

Content Creation and Editing: Audio content will be recorded with a range of techniques including DAT tape, Minidisc and ADAT multichannel with a variety of appropriate microphones, including Audio Technica PRO 42 boundary microphones and a Soundfield type array. Microphone preamplifiers will be matched for phase linearity, a key aspect of any surround audio application. Audio will be transferred using ProTools software and interface within the digital domain to computer hard drive or backup and editing. Source and edited material will be archived on CD-ROM or DVD-ROM.

Audio for 5.1 surround will be encoded into Dolby Digital (AC3) at 640 kbps using SmartCode Pro within a ProTools TDM environment. All multichannel audio will be maintained in the original uncompressed discrete format for backup and archiving. The choice of DVD 5.1 audio format not only reflects the need for a relatively accessible surround sound replay format but the current inability of the audio industry to settle format specifications for DVD-A, the proposed audio only format. All source material will be DVD A ready in the unlikely event that this becomes a readily accessible format standard within the duration of the Fellowship.

Any moving image content will be shot on Digital Video Camera with Firewire output allowing direct transfer from original media to computer hard drive. A suitable edit program such as Final Cut Pro or Adobe Premiere will be used for editing. Master edits will be archived on CD-ROM or DVD-ROM.

Streaming from Media Files: It is likely that a number of media types will be created from audio and DV masters. Should the ability to accommodate DVD 5.1 audio or similar future formats become possible within the duration of the Fellowship the specific website software suggested here will be updated accordingly - all source recordings being archived as discrete data so encoding for future formats will be straightforward with no generation loss between source and distribution format.

To ensure cross-platform compatibility the work will present a number of high-quality encoded streaming formats. The leading contenders to be investigated are:

Quicktime - a suite such as Media Cleaner Pro or Quicktime Pro will be used to flatten, cross-platform and compress content into a suitable Quicktime format. For Quicktime web distribution and streaming, Sorenson compression is the preferred format. This method requires the use of the Quicktime streaming server and also for the Quicktime plug-in to be installed client-side. The Universityís Audio Visual Centre is currently developing a QT streaming service.

RealMedia: RealProducer content can easily be output to RealMedia, requiring RealPlayer to be installed client side. RealMedia can be streamed directly from a regular http server. There is the option to publish to a RealServer which may allow higher levels of access and enhanced functionality. RealProducer now has the added functionality of adding Keywords to Realmedia files, allowing search engines to recognise content.

Given the practical and conceptual difficulties in documenting this work (see main proposal section ii - research dissemination) it is unlikely that real-time web streaming would make a significant contribution to the research and research dissemination. However, should this become relevant as the project develops facilities will be in place to enable the more complex online delivery of real-time events.

Multicast Streaming: As with recorded media files, alternative streams for the end user are desirable and will be researched and developed as appropriate eg:

Quicktime Multicast: Live input captured from source through broadcast software such as Sorenson Broadcaster is transferred multicast from a suitable steaming server. Mac OS X server technology will allow approimately 1000 simultaneous streams. Client side systems require the installation of the Quicktime plug-in.

RealMedia: requires a combination of RealProducer and RealServer to create a live stream. The live feed is fed directly to RealProducer which converts and transfers media to the realServer for streaming live events.

The Online Installation Diary will be a standard HTML website with access to supporting material in the form of Quicktime or RealMedia files and archived text and index material using standard HTML or PDF format where appropriate. Adobe PDF is a technique for creating documents of relatively small file size which are easily distributed online and maintain design integrity. These documents have all the link functionality of the main HTML site and will be ideal for archived texts, footnotes links to source references and a master index for the whole project.

At every stage, work will be created using industry standard software. I have many years of professional practice with audio software eg: Sound Designer, Cubase, ProTools, Quicktime and others on a variety of platforms and currently operate and maintain a website serving my commercial interests using various standard HTML authoring tools plus Adobe Photoshop, Quicktime and Adobe Acrobat etc.

This proposal has been discussed and advised on by the following:
Andrew Burton, Head of Fine Art, University of Newcastle; Andrew.Burton@newcastle.ac.uk
Catherine Owen, Manager, Performing Arts Data Service; cath@pads.ahds.ac.uk
Susan Hiller, Baltic Professor for Contemporary Art; Susan.Hiller@ncl.ac.uk
Monica Ross, AHRB Fellow, University of Newcastle; monica@intertextualiser.com

3 - infrastructural support

The University Computer Centre provides web space and e-mail as standard facilities and has a permanent 34mbps connection to the Internet and an ISDN connection of 64 kbps. PC and Mac clusters of suitable computers are distributed at several sites on the campus. Key sites have 24 hour access.

In addition I have my own equipment, hardware and software compatible with computers within the Fine Art Department for preparation and editing of digital audio to CD or DVD standard.

Data and Archive Integrity:
All material will be backed up to appropriate storage media, original uncut multichannel audio and edited versions to data CDROM or DVD-ROM, website versions to CDROM as updates are introduced plus an indexed online archive version. Any visual material will be backed up in data format on CDROM or DVD-ROM.

Systematic archiving will provide a master data resource from which a comprehensive data archive will be collated and indexed from each year of the Fellowship. The precise timetable for creation of the archive will be determined by the occasion of each test version, installation and responses within the programme. Each stage of the work will be treated as distinct phases of development, production and archiving to ensure steady progression and completion and continuous data integrity.

4 - data preservation and access

proposed data preservation and access arrangements

A comprehensive archive of the research and outcomes of the Fellowship will be developed as follows:
A series of audio CD and DVD discs with audio documentation encoded in stereo and 5.1 audio format and a CDROM containing the indexed website archive will provide a complete reference index of all recordings in context with associated written and visual data.

The CDROM data will be available online and should the technology become available within the duration of the fellowship it is hoped that the DVD material would be made available online.

As many copies as required will be deposited with PADS/AHDS within 3 months of the completion of the project. Copies will also be supplied to the National Sound Archive and the World Soundscape Project.

As data deposited with PADS/AHDS is open access for educational and academic use I foresee no concerns about the use of any material deposited (see section 2 of this Appendix).

The research unit of the University publishes clear guidance on intellectual property, technology transfer and the license agreement with the research Councils in its website

In accordance with the published statement, matters of intellectual property would be discussed and agreed with the Research Unit at the outset of the Fellowship and their consultation sought on any issues which arise thereafter.