

ZVUK

M. GREATED
Glasgow School of Art, Glasgow, UK.

ABSTRACT

The author uses her exhibition *Zvuk* to explore ways in which sound within an exhibition of static visual art affects the overall sensory environment. *Zvuk* relates to the theme of anthropogenic noise and includes a 20 m panorama with surround sound. Independent evaluation reinforces the hypothesis that the visual and sonic images are strongly related.

Keywords: art, colour, evaluation, exhibition, M Greated, noise, panorama, science, soundscape, sound, *Zvuk*.

1 INTRODUCTION

For some time through exhibitions such as *Sonitus* and *Kyst*, the author has explored the connections between sound and vision and challenged this through her art practice. The hypothesis is that the occurrence of sound within a visual art exhibition changes the way in which one experiences the visual art, and vice versa, and that the overall sensory environment significantly affects the way in which a ‘viewer’ interprets and responds to either the sound or the visual elements in the work (Throughout this text the word ‘viewer’ is used to refer to the audience. This is the normal word to describe the audience/viewer/listener/participant in a visual art gallery context). The author is specifically looking at the combination of static visual art, in particular, the notion of painting and the panorama within a sound environment. There has been much consideration of sound in connection with the moving image through film and video or sound with other digital media such as computing and web based art but there is little evidence of research into sound (as opposed to music) in connection with drawing or painting.

The art gallery, both traditional and contemporary, is generally a place of quiet contemplation or reflection. Sounds within galleries are often assumed to be disruptive, therefore, a considered use of sound has much potential to affect the viewer. The addition of sound to what is traditionally a visual arena brings not only a time-based element into the visual work but also creates a different focus and opens the possibility of multiple channels of experience. This text addresses these issues using, as a case study, an experimental exhibition where sound was used alongside paintings. The exhibition held in Minsk, Belarus, was entitled *Zvuk*, the Russian word for sound.

2 BACKGROUND

Since 2007, the author has worked with sounds placed within the same environments as panoramic paintings thus situating her practice within the traditions of panoramic image and landscape painting as well as those of audiovisual installation. This work has stemmed directly from an attempt to marry the two areas of the audio and visual, considering the nature of each and allowing them to have a symbiotic relationship where one gains and feeds off the other with the resultant meaning being more than the sum of its parts. One of the unusual aspects of visual art, in particular painting, is that it treats the visual work as a temporal, experiential work, through the act of the viewer having to look or scan over the work with no fixed viewpoint. This treats the painting or image as an installation, where the space itself and the environment are integral to the artwork.

The themes within the work relate to sound and came through an investigation of noise within our current environment, with both the visual and sonic imagery stemming from this. Scientific research

into sound within the environment has been considered by the author to understand the related issues and the artwork has stemmed from ongoing collaborative work with scientists at the University of Edinburgh whose disciplines involve sound in the environment and research around measuring, detecting and combating associated issues that arise in relation to sound and what is commonly referred to as noise pollution. The paintings depict subjects varying from traffic and transport, such as motorways and aircraft, through to power plants and wind turbines and the soundscapes have evolved using the same subjects as starting points.

Some of the visual works had been shown before in previous exhibitions and some were new works such as in *Harbour* (Fig. 1) and *Arches* (Fig. 2) both of which were inspired by contemporary industrial scenes. In different guises, a range of industrial and environmentally associated structures have emerged within the work over the last three years. The visual research for this has been in the form of drawings and photographs from various sites, mainly in Scotland, and some in northern England, such as from visits to Sellafield Nuclear Processing Plant (Fig. 3) and Drax Power Station. *Harbour* is an interpretation of the large industrial harbour at Hirsthals in Denmark, where the author spent time during previous exhibitions. As well as these, there are local subjects such as the *M8* motorway (Fig. 4), which is an influential aspect within the artist's home city of Glasgow and often referred to as a scar on the city, and the local railway arches, both of which represent the enormously influential impact of transport within our environment.

The sounds were all field recordings directly relating to the images present and represented sounds such as planes, traffic, power stations, wind turbines, etc., that were edited into one continuous soundtrack. The different sounds overlapped and cut each other out resulting in a non-rhythmical background of sounds with occasional distinct sounds coming through such as those of the plane. The soundscape echoed the subject matter, as well as the confusion of the panoramas with no one particular focus or starting or finishing point. Rather they both represent a mesh of difference and to some degree conflict.

The visual and audio works were made in tandem to each other with audio and visual research being carried out often at the same venues, on the same days. Because of practicalities the editing



Figure 1: *Harbour*.



Figure 2: *Arches*.



Figure 3: Photograph of Sellafield.

and mixing of the audio work was carried out in short focussed periods in a sound studio, whereas development of the visual work continued over longer less intense periods of time. At some points, the visual work was made before the audio and vice versa, with one feeding from the other continuously and both now being ongoing elements within the authors work despite her background in visual arts. Both the visual and audio work influenced each other throughout the process although at times this was difficult to assess as, except for the initial accumulation of material, they were created in different spaces at different points. The first point where they were seen as one piece in their entirety was in the exhibition itself therefore this staging or showing of the work is critical to both its reading and its future development.

Figure 4: *M8*.

3 THE EXHIBITION

Zvuk was held in September 2008 in a gallery in the Palace of the Republic: a large cultural centre in the main square of Minsk, the capital city of Belarus. The city itself has a population of around two million with the central square being the hub of the city, acting as a local landmark and meeting place. Hosting a range of activities such as ballet, opera and musical concerts, the building has a restaurant, café and also a municipal art gallery that has connections with the University of Culture in Minsk and hosts a diverse range of contemporary exhibitions. The curator Denis Barsukov, also an artist, works alongside an assistant and a small team of invigilators/installers to run the gallery. Most of the work shown in the gallery originates from Belarus and the former Eastern Bloc. There is limited international art exhibited in Minsk due to the political climate creating a scene rather isolated from international, and particularly western, markets and cultural interactions. However, these do include some more experimental exhibitions curated by Barsukov in recent years such as *Techno Art* in 2007 [1]. Despite the apparent inaccessibility to wider markets and cultural scenes in Minsk, experience has suggested that through the media, the people are culturally aware of the international context and are unusually active in terms of frequenting cultural activities.

The gallery is housed in the lower part of the building and consists of three adjoining rooms, two rectangular and one which is almost a hexagonal space. As the viewers entered the main door of the gallery they came upon a proportionally long rectangular room (Room 1), which led through to two other rooms, with the natural passage taken being through the hexagonal room (Room 2), then to the final room (Room 3). This varying room structure was used strategically to enhance the different uses and discrete nature of the work in each room with the hexagonal room in particular allowing the opportunity to work within a space that surrounded a viewer in an effectively circular way [2]. There was a seemingly innate order through which viewers negotiated the space within the gallery that enabled the artist to have control over the sequence of experience and how works would be come across and this partly dictated the installation and assisted decisions in the placement of works throughout the three spaces.

In Rooms 1 and 3, paintings were hung of various sizes and subjects (Fig. 5), whereas within the hexagonal room two long images were hung creating the idea of a panorama, which wrapped the entire perimeter of the room, bar the doorways (Figs 6 and 7). This was made up of two one-metre high paintings, with the circumference of the room being approximately 20 metres. The panorama was installed into the gallery by being attached to a made to measure metal frame, which was hung in sections around the wall. The painting was then attached to the front side of the frame, which was then hidden, creating a continuous line with the paper sitting around 100 mm out from the wall. Also, within this room a three-dimensional soundscape was installed with the 5:1 surround sound speakers being placed strategically within appropriate corners around the gallery. What resulted was a space in which the viewer was surrounded by the painting, in a similar way to the original panoramas of the 18th and 19th century, yet also encompassed by loosely relating sounds.



Figure 5: *Zvuk*.



Figure 6: *Zvuk* panorama (section 1).



Figure 7: *Zvuk* panorama (section 2).

The opening of the exhibition itself was structured quite differently to the norm in the UK with people arriving prior to the opening time, making it more like a launch or a happening. At the allocated opening time there were a series of translated speeches given by Denis Barsukov (Curator of Palace of Culture Gallery), Debbie Radcliffe (Head of Mission at the British Embassy), Academician A.V. Belui (Belarus Academy of Sciences), Nikita Foamin (Belarus Academy of Sciences) and myself. The opening was very busy with approximately 100 attendees comprising a wide mix of people, ranging from scientists from the Academy to artists, art historians and other people from the cultural sector, creating an interesting dynamic. A local performance artist and curator, Denis Romanovski, who had organised an annual international performance festival [12], I attended while I was in Minsk, commented that this is what they have been fighting and struggling for within Belarus, the support and recognition of art and science and also new media art. He was excited about the fact that the Academy of Science wants to play a role within arts or culture and the fact they had invested resources into this relationship. He seemed to think that this was a shift in thinking from the point of view of scientific bodies and was keen to engage them further and it was suggested that this exhibition could be seen as a stepping-stone into allowing the local artistic and science communities to gain some common ground. Several journalists and press attended with three interviews with different national TV stations, a German and a local radio station and three interviews for Minsk newspapers. The exhibition was then open for a further 15 days throughout which there was considerable attention from the media as well as the public and local art community.

4 THE PANORAMIC IMAGE

The principals of traditional panoramas [11] are quite different to those of the history of landscape painting in as they are specifically made to surround the viewer, thus giving a feeling of being immersed within the image or view. In *Zvuk*, the technique of encompassing the viewer was an interpretation of the formal tradition of panoramas which stretches back over 200 years. The word panorama was first used in 1791 to describe a deceptive 360° illusion of a view, as discussed by Rombout [14], rather than the current more general use of the term as an overall view. Traditional panoramas are specific installations where a circular painting is housed within a purpose made structure with a central viewing platform.

Nowadays, the word is often used to describe any image which spans across a view or landscape and generally is used for those that could not be seen or interpreted in one glance and need multiple perspectives or for the eye to scan across the horizontal plane. See here the work of Jeff Wall [7], who often uses photomontages to give panoramic perspectives of scenes. In particular, his reference to this in *Restoration 1993*, taken in the *Bourbaki Panorama* in Lucerne (1870), where Wall creates a cinematic view depicting restorers working on the panorama although unlike some other works does not use the entire 360° and keeps part of the scene out of view. The idea that an image encircles the viewer can be traced back much further though and even relates to some early cave art such as that which can be seen in the *Jebel Acacus* in Libya, where drawings use the natural architecture of the rocks in relation to the viewer. Previous examples of the author's own works with panoramas include full circular panoramas in a reverberation chamber in The University of Edinburgh and *Milieu* in the interior of a boat moored at the Falkirk Wheel, as well as long panoramic paintings/drawings such as those shown in *Sonitus* in Bangalore or *Marking the Terrain* (Fig. 8) in Glasgow School of Art.

Within the panorama in *Zvuk* the compositions are not representative in terms of perspective or colour [6]. The composition was created by editing together a range of drawings and photographs to create an amalgamation of industrial structures and transport systems within the image. This composite of images has differing elements running through it such as a general horizon, a series of diagonal sweeping lines providing a background structure, structured areas such as areas of buildings and a series of focal points such as drawn areas of lorry, aircraft or specific buildings. Most of the focal points are relatively high, hung approximately at eye level, to create an approximation of a horizon. There are, however, differing scales, materials and concentrations of paint with some areas painted very loosely with rather muted colour and tonal values and other areas painted more decisively. There is also a considerable amount of drawing in pen, pencil or fine brush, which also makes surface differences in texture and intensity. Some areas, such as the lorry (Fig. 9), are drawn relatively accurately in pencil, whereas other aspects, such as roads, are depicted through loose lines in paint. There is also considerable space and quiet within the image to allow the eye to rest and to represent the contrasting



Figure 8: *Marking the Terrain*, panorama.



Figure 9: *Zvuk* panorama detail.

sporadic structures and beguiling nature of our landscapes. These facets are also represented through the soundscape with reference to focus and rhythm within the composition. Using a change in pitch and vibrancy throughout the work in the form of intensity of colour/ tone, mark making and composition is a conscious way of making images about the complexities within our environment and the alienation and confusion that modern industrial spaces can evoke. Because of the very long extended format the images lend themselves to the notion of multiple perspectives with the eye being encouraged to move throughout the composition aiding the intensity of rhythm and movement, again echoing the related soundscape. There are certain key lines or structures within the composition that aim to hold the eye within the narrow band surrounding the room thus helping to focus and maintain intensity and flow through the visual work. This movement of the eye within the work is critical to its reading within the context of the audio work and suggests an element of time and space within an otherwise static visual image.

Because of the layout of Room 2 the panorama fell into two different halves each of which housed a long drawing. One had been shown before in *Sonitus* and the other had been made for the space; together they made up the whole panorama. The audience invariably stood centrally within the room, gazing at the overall view and occasionally focussing or going close up to a specific section. They did, however, generally look at either one side of the installation or the other due to the panorama being in two sections, something that was physically difficult to overcome, although the edges of the panorama were still outside the viewer's field of vision.

The panoramic images are on paper and are painted in acrylic and gesso with drawing intervening and overlapping in pencil, ink and paint. The paper itself is reinforced with glass fibre, used to maintain the longevity of the work, particularly in transportation and installation, and has a rather porous and rough looking finish. The paper is absorbent of the paint and therefore creates a slightly hazy edge when very wet paint has been applied, which contrasts suitably with some of the more linear areas of drawing or the thicker impasto paint. Installing the panoramas is rather cumbersome because of the

desire to maintain the full length, i.e. one continuous piece of paper for each length of wall in the exhibition without folding, damaging edges or ripping in the de-installation.

The colours within the panoramas are from a limited palette ranging from viridian green through to ochres and greys, mainly within the earth range of colours. This simplification of palette and narrow colour range within the panorama contrasts significantly with the other paintings in the exhibition. This again separates the impression given by Room 2 and creates a distinct environment within this space. The decision to use a limited palette seems to have enhanced not only the slightly unnerving atmosphere within this room but also allows the images and sounds to take precedence over the colour or added element that a vibrant use of colour may bring within this already complex work.

In The Hague, Netherlands there is an excellent example of a complete panorama known as the *Mesdag Panorama* (1881) (Fig. 10), after Hendrik Willem Mesdag, the artist who painted it. It is almost 120 metres long by 14 metres high, one of the few complete panoramas in Europe and the oldest one in its original location [17]. Panoramas were normally housed in purpose built pavilions with natural lighting coming from the ceiling, a central viewing platform and distance between the viewer and the work to help create the illusion. The painting within this panorama is a precise depiction of the scene, as one would imagine it was. Mesdag corresponded with and was inspired by Willem Roelofs (1822–1897) and his desire was to create a naturalistic image within his painting. Seeliger ([17], p. 25) points out that Roelofs' mission was to 'try to discard all mannerisms and in a word try to imitate nature through feeling'. The colours are rather muted, almost as in a hazy day, and create a relatively accurate impression of looking into the distance.

Due to the enforced distance created by the physical setting of the pavilion style gallery a viewer cannot get close to the painting itself therefore the discrepancies of brush strokes or technical representation of the scene are more or less invisible to the naked eye. This creates a photographic, almost lifelike image where the viewer has the sensation of standing within this setting and genuinely looking out over the view. Jan Wolkers describes this sense of awe ([17], p. 58), 'You slip in to be



Figure 10: *Mesdag Panorama*.

overwhelmed by improbably distant views from the top of the dunes, to be made giddy with the heaving swell of the vast sea, to breathe the air of the scale-encrusted nets, blending with the tarry smell of freshly-caulked fishing boats on the beach, and the stench of rotting cockles among the washed-up jellyfish and the glistening sea lettuce along the high-water mark, to be sucked up with streaming hair into the clouds, to fly with the seagulls, to veer like the swallows among the orange roofs of the peaceful fishing village, where the bracing air of pickled herring seeps from the very windows, to ripple along with the marram grass covering the dunes, where the biotope of lizard and backstriped toad has been blended with masterful strokes of the brush in the vegetation and the sand.'

An additional element to the *Mesdag Panorama* is that there is sand and actual debris, such as driftwood, etc., placed between the viewing stand and the physical painting. This enhances the creation of the optical illusion of standing in a central viewing point as it becomes difficult in places to tell where the real sand finishes and the panoramic image begins. It adds a very different element to the work as it takes on the physical presence of the space, adding to the idea that this is an early environmental installation, created with what is possible and available. This method of display is still used extensively in museum natural history displays of animals and birds as well as in botanical gardens such as the cactus house at Kew.

Within the museum now there is also a soundtrack which plays as the viewer observes the panorama although unfortunately this is a rather tame description of the work aimed at the general public or tourist. This distracts quite significantly from the viewing of the work as it gives a very specific viewpoint or slant to the reading of the image. The soundtrack is an aural interpretation of the work and its history, with some additional background music and is not in keeping with the period of creation of the work or in my opinion the intention. The context for this type of panorama is also of interest as the pavilion with viewing platform, sand, debris and voiceover is housed within a museum, making it a rather odd scene rather like a beach amusement or novelty aspect of a holiday. The pavilion structure certainly is part of the work, although the context can confuse the intent and rigour of the powerful panoramic image. The scale, lighting and viewing pavilion created for this panorama are integral aspects of the work and even today people are intrigued by the work and atmosphere it creates.

Currently, there have been many developments in panoramas in relation to photography, virtual environments or digital manipulation such as those by Scottish artist Graham Mack [20]. Similar processes are also used by estate agents on their websites to enable prospective clients a 360 view of a house. In *ArtVision*, the museum magazine for *Mesdag Panorama*, 'an unlimited view in all directions', 'a constantly changing scene' and 'a clear view of a specific subject' are all suggested as different ways of viewing. The traditional panoramas were as lifelike as was possible to create at that time. However, there have been many interpretations and much scope for exploration and the role of the panorama is constantly changing, being reinterpreted. Rombout even devotes a section to these new interpretations in *The Panorama Phenomenon* [14], where contemporary and particularly digital photographic versions are investigated.

A significant difference in the author's panoramas and those referred to is that the *Zvuk* panoramas are not realistic observations of a scene but rather an amalgam or composite image of a landscape. They use methods of painting to represent but also to obscure and create different focuses within the work. They are not supposed to be observed purely for the spectacle of seeing but rather to create a surrounding environment for the viewer to inhabit, as opposed to the workings of the camera obscura, where one is confronted by a moving image but where the sound element is absent. The soundscape is critical to the reading of the *Zvuk* panorama; however, both the *Mesdag* and *Zvuk* panoramas create an environment through the tools of a surrounding painting and an environment integral to experiencing that, in physical and sensory terms.

5 THE SOUNDSCAPE

The soundscape was installed in the central gallery space with the objective of combining the visual and sound elements to create an immersive environment for the viewer. It is known from previous psychoacoustic tests [8, 18], that the sonic environment in a space affects the way in which visual images are viewed therefore combining the two should affect both the reading of the visual and the sonic. Because the panorama encircles the viewer a surround sound installation was particularly appropriate, so the two elements worked in tandem to create an atmosphere of complete immersion in the environment as well as introducing a temporal element into the work. The soundscape was made up from a series of sounds commonly heard as part of our man-made environment, recorded by the artist in the field. The experience of the artist in actually recording the sounds in person on location was felt to be important and for this reason sound effect records or downloads were never used even though there are vast collections freely available from archival sources and the internet. McCartney ([9], p. 2) says 'Can you call a piece a soundscape if it is made from sound effect CD's? Does it make a difference? How well do soundscape composers know the place that they record?'

The sounds were recorded digitally and then mixed and edited on Cubase to create six surround sound files which were then played through the 5.1 surround sound speaker system. The reason for using the surround sound was to give the most realistic overall impression of sounds moving in a space and to move away from the directional stereo sound that often comes from speaker systems but does not represent the more reverberant reality of differing environments nor the specific movements of certain individual sounds. Surround sound gives the artist more control of how the sound works with images and encourages a closer relationship between the sound and image. In many ways, it allows the artist to compose sounds within a space the way that one may compose elements in a painting or install works within a gallery.

The word soundscape is the sonic equivalent of the word landscape and refers to the aural environment or sound picture that is created by a collection of sounds, with different connotations, dependent on the context or one's standpoint. A scientist may think of a soundscape as being the sound environment in a particular location with urban soundscapes, for example, often taking the form of complex noise maps constructed prior to the approval of a residential development to check that the ambient sound levels are of an acceptable level. An artist, on the other hand, may create a soundscape by combining different sounds in order to evoke concepts or sensations associated with a particular environment or indeed create an imaginary environment through a soundscape. This idea has its origins in the Musique Concrete movement developed in Paris in the 1950s by composers such as Pierre Schaeffer. Musique Concrete differs from other electronic music composition by being made up from recorded or 'found' sounds, as opposed to sounds that have been generated by electronic synthesis. These sounds are pieced together and manipulated in various ways to create a complete composition, but as Roads [13] points out, 'it also refers to the manner of working with such sounds. Composers of Musique Concrete work directly with sound objects. Their compositions demand new forms of graphic notation, outside the boundaries of traditional scores for orchestras.'

In the case of the *Zvuk* soundscape, the graphical notation was produced by Cubase software that generates a display of the complete sound set shown in a temporal framework, effectively replacing the orchestral score. In the 1970s, a movement of acoustic ecologists emerged in Canada, dedicated to the recording and preservation of environmental sounds and this ultimately led on to a genre of soundscape composition, which is now accepted as a musical form in its own right. McCartney [9] says, 'All of the processes involved in soundscape composition, from listening to recording, composition and reception, are deeply enmeshed in issues of time, memory and place.' In discussing the composition *Cricket Voice* by Hildegard Westerkamp, McCartney says, 'Westerkamp challenges the description of soundscape composition as similar to Musique Concrete. Westerkamp asserts that

soundscape composition begins with conscious listening and awareness of our role as soundmakers. This is awareness of sound in context – unlike with the sound object of *Musique Concrete*, sound is not isolated but forms part of an environment that shapes it.’

Early *Musique Concrete* used tape recorders to piece together sound fragments, which may or may not have been manipulated by analogue devices such as filters and tape loops. Contemporary soundscapes, on the other hand, can utilise the vast resources associated with digital technology to form found sounds into complete works. In structural terms, as pointed out by Traux [19], a soundscape may be based on a fixed, moving or variable spatial perspective. From the fixed perspective, the listener is static and the movement of the sound itself creates the temporal element. In the moving perspective, the listener goes on a journey through a series of acoustic spaces, e.g. entering a harbour on a boat or moving from one room to the next. Variable perspectives are more abstract; they edge away from the creation of a single coherent landscape image and do not necessarily have clear analogues in the real world. Within these structures there may be a myriad of sonic transformations, e.g. changing speed, reversing or reverberating, and the soundscape may be triggering memory recollections, rather than reconstructing a real situation. The *Zvuk* soundscape operates from a predominantly fixed perspective.

A major advance in the production of soundscapes in recent years has been through the use of multi-phonetic sound reproduction systems, usually known as surround sound. Early recordings for soundscapes, e.g. the first recordings for the World Soundscape Project at Simon Fraser University, Canada [19], were stereophonic (or stereo), giving a limited degree of directionality in the reproduction space. In stereo reproduction, the sounds are panned between two loudspeakers in front of the viewer, but there are no sounds from behind. Later works frequently use octophonic surround sound, which gives a much greater degree of immersion in the sonic environment. For practical purposes, it is possible to achieve very realistic spatial movement of sound in the horizontal plane by recording in mono and then intensity panning the resulting sound to the five channels in a 5.1 configuration in which five loudspeakers handle high and mid range frequencies and the sixth channel is used solely for the low frequencies or bass, known as low frequency effect (LFE). This was the procedure used for the *Zvuk* soundscape. Strictly speaking, the signals routed to each loudspeaker should incorporate both intensity and phase differences, dependent on the location of the sound source, but as pointed out by Moore [10], ‘One of the most important perceptual cues for both the direction and distance of a sound source is its intensity.’ So in practice the phase differences can be ignored with very little sacrifice in realism. On a matter of nomenclature, according to Rumsey ([15], p. 88), ‘strictly, the international standard nomenclature for 5.1 surround should be ‘3–2–1’, the last digit indicating the number of LFE channels”.

Six core sounds were used to produce the *Zvuk* soundscape: (i) motorway 1, (ii) motorway 2, (iii) a train, (iv) a plane, (v) a pneumatic drill in the street and (vi) a hissing factory noise. These were all recorded in mono with a high quality dynamic microphone and a digital recorder and when necessary a muff to minimise wind noise as the recordings were predominantly taken outdoors. There were effectively three characteristic time scales on which the different sound fragments occurred; a second for the industrial noises, ten seconds for the passing trains and aircraft and in excess of a minute for the background motorway. The sounds related to the images making up the panoramas, e.g. the aircraft sound, but also evoked subconscious links with the paintings in the other spaces within the exhibition, e.g. the train sound and the motorway. The source material for both the soundscape and paintings were often taken at the same time.

Spatially the most successful movement effects were obtained when the sound source was recorded passing close to the microphone, e.g. the train sound was recorded on a station platform when a train approached from a distance, drew up alongside the platform and then drew away again. Similarly, the aircraft sound was recorded close to an airport as the plane flew overhead. As with most natural

environments, the overall sound was a combination of specific discrete sounds with well defined directional characteristics and more general background sounds coming from all directions. Rumsey ([15], p. 2) points out “overall then, the spatial characteristics of natural sounds tend to split into ‘source’ and ‘environment’ categories, sources being relatively discrete, localised entries and environments often consisting of more general ‘ambient’ sound that is not easily localised and has a diffuse character. Such ambient sound is often said to create a sense of envelopment or spaciousness that is not tied to any specific sound source, but is the result of reflections, particularly in indoor environments. The spaciousness previously referred to as ‘outdooriness’ is much less related to reflections, probably being more strongly related to the blending of distant sound sources that have become quite diffuse.”

The soundscape was constructed in Cubase SX3, a music production software package produced by the German company Steinberg that incorporates powerful editing facilities. Cubase has a feature that allows monophonic signals to be panned between five loudspeakers arranged in a 5.1 configuration, i.e. left front, right front, centre, left surround and right surround using a graphical interface. With this it was possible to move the sounds around the room in effectively any desired pattern. Thus, for example, the train could be heard to enter the space from one side, stop in the middle and exit at the other side. The program recorded the time histories of the different pans used throughout the soundscape production so that the effects could be reproduced when the soundscape was replayed. Six tracks were set up, one for each of the core sounds, and these were edited for volume and panned between the five speakers to generate the spatial movement. They were then bounced down together with the LFE channel to produce a set of six synchronised wave files, one for each of the six loudspeaker channels. The total length of the soundscape was ten minutes, after which time it was set to repeat as in an art exhibition such as *Zvuk* the soundscape has to be generated so that it plays automatically once it is set up at the beginning of a day. This was implemented by burning all six tracks to a DVD using Discwelder Bronze software.

Because of the multi-directional nature of sound within a reverberant setting there is a potential problem of noise pollution in the surrounding areas. Within the gallery that hosted *Zvuk* Rooms 1, 2 and 3 were adjoining with doorways that were open and wide, with no sound barriers. The sound from the panoramic room, Room 2, therefore, did extend outwards and percolate into the other rooms (Rooms 1 and 3). The fact that there was sound throughout the entire gallery meant that the sound environment upon entering the panoramic room was less alien to the viewer. Because of well-known diffraction effects [4] the sounds that carry throughout a large space are the ones with more bass; therefore, in Rooms 1 and 3 the sounds were relatively distorted and non-directional with the louder sounds and low frequency sounds carrying through and the subtle noises attenuated. In practice, this resulted in certain sounds such as the plane and train being heard throughout the gallery space and others, such as the factory, being almost indistinguishable outside the room which housed the panorama. The author has looked into the possibility of encompassing these findings into future exhibitions either through separating the sound or creating different acoustical spaces or alternatively by embracing this filtering effect and enhancing it through further deformations similar to the way in which the reverberation chamber was used as an extreme reverberant setting.

6 EVALUATION

The philosophy of evaluation is discussed in many texts, e.g. Chelimsky and Shadish [5] and Rutman [16], but is quite complex and so in order to ensure an unbiased view on the impact of the different aspects of the exhibition, a professional evaluator was engaged from the Belarus Academy of Sciences. Thirty people attending the exhibition were selected by the evaluator and asked to give written responses to 14 questions whilst others were selected to be interviewed on a one-to-one basis. The questions were composed in collaboration with the evaluator who also wrote them out in

Belarusian and afterwards translated all the questions and answers into English. The evaluation included questions relating to the age and background of the respondents. These were selected to represent a spread of ages from under 25 years to over 55 years, of which nearly two-thirds of the people questioned were below the age of 30 years and virtually all of these said that they attended art events at least once a year, reflecting the fact that a high proportion of those attending cultural events in Belarus are young people. Twenty percent of the respondents had some professional connection with the arts and most of the responses were quite detailed, well considered and in depth, indicative of both a high level of interest in the artwork and environmental subject matter and a well informed audience.

The first questions put by the evaluator related to the paintings, e.g. 'Have you enjoyed seeing paintings of industrial structures?' and, 'How did the panoramic paintings make you feel?' In response to these there were many comments of a general nature like 'very contemporary, condensed but simple', 'not so much enjoyment, rather a quite new form of painting' which suggested that the exhibition was understood to be significantly different to what people were used to seeing in Belarus. Comments relating more specifically to the industrial landscapes included 'I meditated on a complicated civilisation and man-made world,' 'odd attraction' and 'I began to think about the noise problem.' There was much interest in the panoramic room, exemplified by comments such as 'like finding yourself in the centre of action', 'proximity to noise', 'it creates a feeling of being in a cage; the panorama begins to evolve' and 'there are no corners; it seems like everything is surrounding you'.

The contrasting colour palettes between the different spaces in the exhibition appear to have made a significant impact. One visitor remarked, 'the serious subject was brought to life but in the kingdom of hope there is no winter; the colour shows it'. Another remarked that 'the pink painting remains in the mind most of all because it is pulsating' a reference to the predominantly pink painting *Arches*. The comment 'absolutely vivid and new; bright colours and deep imagination' again appears to relate mainly to the railway and harbour paintings.

One of the primary objectives of the evaluation was to ascertain how the sound affected the perception of the visual images. As the exhibition was set up, the sound was focussed in Room 2 containing the panoramic images so the audience could contrast viewing the individual paintings in a quieter environment with sporadic background noise to the panoramic room, where the images were accompanied by the surround soundscape. Virtually, all the people questioned felt that the sound had a marked effect on how they viewed the images. Typical comments were 'the sound draws attention to the images and makes them more vivid', 'the sound amplifies the illusion of a large space', 'the addition of the sound intensifies the impressions', 'the sound makes it real', 'the sound vivifies the panorama', 'the sound is the reflection of life', 'the perception of the painting depends on the sound', 'the sound with the painting creates a plastic performance in my mind; the picture begins a life in motion', 'the sound helps you to feel ecological problems connected with man-made objects', 'with sound the impression is more absolute' and 'the sound helps you to imagine the objects moving'.

A number of people said that hearing the sounds within the visual environment of panoramas encircling their space, made them aware of sounds that would otherwise go unnoticed. One viewer commented, 'I just want to stop and try to distinguish different sounds; those you can hear almost every day but pay no attention to.' A number of people noted that the sound introduced a temporal effect into an otherwise static image. One person said, 'the picture seems to turn into a movie; the panorama begins to evolve'. Another said, 'The sound helps one imagine that the events and objects are moving.'

Some of the questions related to the overall effect of the exhibition. Out of all the respondents, only one said that they had seen an exhibition like this before. A couple of respondents said that they had previously come across exhibitions, where background music was played. The majority of people

found the effect on them to be disturbing so they left the exhibition with vivid images and an impression of anxiety, rather than a sense of aesthetic pleasure and some of the comments here were quite extreme. Some examples are 'I had a feeling of alarm, stress and even fear. I just wanted to leave the gallery and even the city as quickly as possible,' 'if the painter had wished to awake the public from their daily mental state, she has succeeded in it', 'The images are good but I can't say I like them because the objects induce abhorrence.' One expressed a feeling of 'effort and exhaustion' and said that they would have 'liked the subject matter to have been different, e.g. of nature or children'. Yet another remarked, 'It takes your breath away.' Another respondent saw the exhibition as 'unusual' but 'a harmonious combination of painting and sound'.

There were also questions relating to the social implications of the work and the responses show a general consensus that the exhibition helped to make the audience experience visually and aurally the contemporary world we live in. One visitor remarked, 'I meditated on our complicated civilisation; with the help of sound, the painter uncovers some of the problems of our man-made environment.' Another visitor remarked, 'the painter makes an impression on me; I feel the subject really troubles her.' Most people already knew about the issues associated with increasing sound levels in the environment but thought that the exhibition raised their level of awareness, e.g. one person said 'my opinion was consolidated – I already knew about the damaging influence of industrial development on living nature but the exhibition consolidated my opinion'. The comments suggest that the exhibition stirred the viewer's feeling of what is happening in our present milieu and provoked contemplation and thought.

7 CONCLUSION

The exhibition *Zvuk* came about through development of work around issues of noise in our environment, which led to ongoing analysis of sound and vision within the context of visual art. The use of panoramic images has come directly from the desire to make work that encompasses the viewer and directly relates and blurs the temporal and spatial experience. A desire to create images which are not so fixed or static yet still embrace the sensitive qualities of mark-making, texture and colour that can be found within drawing or painting has emerged as this work has developed. In a similar vein, there is an aspiration to make sounds which are three dimensional and textured, overlapping and complex yet still poignant within the context of an exhibition. It is important to keep in mind the artists own visual background and ensure development of the aesthetics of sound within this context. One observation has been that people find sounds that are not considered music to be noise and therefore a nuisance, as opposed to non-art or design visuals which they find easier to disregard if they do not connect with them. This is after all the origin of the work, from research around noise pollution, but this needs to be constantly re-evaluated in terms of perceived beauty within art or engagement with the visual and aural elements.

The interest in *Zvuk* from the local population and particularly through cultural quarters was overwhelming, with nearly 1000 visitors and much interest from the general public as well as contemporary artists and critics. The curator sent a recent email stating that the exhibition was 'highly valued by the art society of Minsk'. The interest was three fold in that there was a genuine interest in the artwork itself, in the paintings as well as the soundscape. There was also a deep curiosity around the idea of artwork relating to an issue such as the environment, which was uncommon if not unheard of in their current scene, and also there was a sense of enquiry around the use of sound alongside the rather industrial images. Many of the conversations were around the role of art in society, something that has radically changed as Belarussian identity has emerged from the former USSR, and the possibilities that are open in terms of materials and new technologies.

As stated by Calvert et al. [3], 'A recent study has revealed that vision can be radically altered by sound in a non-temporal task, even when there is no ambiguity in the visual stimulus.' *Zvuk* as well

as being an exhibition was also a testing ground for a variety of aspects of art practice mainly around how we experience work and how differing sensory experiences affect each other. The level of enquiry and interest that came from this exhibition, both in terms of reflection of practice and through the response of the audience and local community in Minsk, has further engaged the author in the exploration and connection between sound and vision and how this can be a vehicle through which to create and experience art.

ACKNOWLEDGEMENTS

The author greatly acknowledges funding from the Engineering and Physical Sciences Research Council, support from the British Embassy of Belarus and suggestions from Martin Hammer and Karen Forbes.

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