ACOUSTIC DESIGN: AUDIO MUSEUM

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Abstract- Our research is based on the premise that soundscape is a complex sounding system that is changed by the development of society, shaping our understanding of the location and space. Using soundscape as the concept we present a joint paper that involves humanistic and technical sciences, such as ethno-musicological and electro-acoustical approaches to the sound design of the Audio Museum, created as part of the "Ronjgi Interpretative Centre" Project in Viškovo. The idea here is the acoustic design of the exhibition space in the function of presenting cultural heritage, namely, the traditional music of the North Croatian Littoral area. In this paper we present the preliminary concept of the Audio Museum, which involved the making of the integral design with the purpose of achieving a new aural and semantic experience of the space, analyzed on the example of four multimedia installations.

Keywords- Soundscape, Audio Museum, Multimedia Installation, Acoustic Design.

I. INTRODUCTION

In this paper we present the preliminary concept of the acoustic design of the exhibition space on the example of four multimedia installations. What we have here is the exhibition space within the "Ronjgi Interpretative Centre" project that is being carried out in the municipality of Viškovo. The municipality of Viškovo is in the vicinity of Rijeka. It is the biggest municipality in the Primorje-Gorski Kotar County regarding the number of inhabitants. It is known for the tradition of Zvončari, the carnival bell ringers, and the composer Ivan MatetićRonjgov's birth-house, today a Memorial Centre and for a number of year's Centre of a County cultural institute. As such, the birth-house of the composer is a cultural capital that in accordance with its strategy the Municipality wishes to modernize. Having commenced in the year 2013, the project was ambitiously planned with the aim to construct a complex in the function of cultural and traditional contents and encouragement of the development of cultural tourism.

Designing the space with the exhibition function of 400m² was a complex task that assumed devising the concept of the exhibition space in which both the traditional music and the composer Ivan MatetićRonjgov were going to be presented. The significance of the great Croatian composer and ethno-musicologist Ivan MatetićRonjgov (1880 – 1960) lies in his valuable composing opus and exceptional contribution to the traditional music of Istria and the Croatian Littoral that UNESCO protected as intangible cultural heritage in 2009.

The required condition that the space be multifunctional, namely, provide the exhibition, concert and conference functions, significantly narrowed the choice of the preliminary concept, primarily the exhibition one. This is the reason why the concept of virtual interpretation of the exhibition content was the (only) solution. On the one hand this solution was necessary, while on the other hand it was motivating, especially with regard to the choice of methodological approach – the "soundscape" concept. It is precisely this concept of markedly interdisciplinary nature that treats the sound electro-acoustically, analyzing and interpreting it, taking interest in it as an aural experience and a resource of acoustic formation (Murray Schafer,1994).

The acoustic design of the space was devised through multimedia installations, ten of them in the interior and one installation in the exterior. Through all of the eleven installations sound is a dominant media also in the physiological sense as a sensorial mode of communication, while in the physical sense as material. Based on this concept, the exhibition space has been named *audio museum.*

The work on the preliminary concept of the acoustic design of the Audio Museum lasted a little longer than a year, including the interdisciplinary joining of forces of ethno-musicological, IT and electro-acoustic sciences. The specific quality of joint work consisted of equal participation, which presupposed the negotiating of expert fields of work, especially so in the phase of creating and forming of ideas. In short, the electro-acoustic approach and IT insight was indispensable due to the necessary acoustic measurements and the technical, digital and technological work out of installations, while the part of the ethno-musicological approach was irreplaceable in the choice of theoretical frame and analysis of the content of audio material.

1.1. Defining the scientific field of Soundscape phenomenon

The concept of Soundscape is defined within the framework of sonic environment as the relationship between a real or abstract landscape and the composition of its sound. Defining the soundscape

phenomenon, this nowadays relevant field of interest, simultaneously took place in different scientific and artistic disciplines, in accordance with its interdisciplinary nature. The earliest traceable mentioning of soundscape is found within the architecture of urban space and the aural perception of the experience of space,according to Rasmussen in 1964 (Oberman, ŠćitarociObad, Jambrošić, 2014). The rising awareness of the aural dimension of space within the architectural acoustics results with the development of the concept on acoustic pleasure as well as the"correlation between sound and the visible spatial and activity form",according toSouthworth in 1969(Oberman, ŠćitarociObad, Jambrošić, 2014).The soundscape phenomenon enters the field of biology within the term biophony and geophony (Krause, 1987). It is defined as a cross-disciplinary science that combines biology and acoustics. In the context of the ecology of the environment, this concept has greatly contributed to the research of the impact of sound and sound relations between nature and man, especially so with regard to the changes that take place as a consequence of sound pollution.

A significant contribution to the development of the soundscape concept from the perspective of phenomenology and psychoanalysis has been made by the French philosopher Gaston Bachelard, who has worked out the idea of imagination and memory as processes that are strongly connected with the space and time. Developing the idea, Bachelard speaks of the internalization of the space as the knowledge of time and the place where memories and perceptions are "housed" (Bachelard, 1964).

It is musicians who consider the concept of acoustic scenery in their artistic way, Karlheinz Stockhausen deserving special mentioning as it is he who looked into the concept of spatial music that intentionally exploits sound localization. The category of electro-acoustic music, artistic reportage and documentary making was developed by Pierre Schaeffer who looked into soundscape through his own concept of *Musique Concrete and* "sounds object" as realities which could be abstracted beyond the "sound-producing body" that generated them. In this circle it is noteworthy to point out the contribution of John Cage who deals with sound and the acoustics of space through various experiments. His famous Silence Sonata 4'33" has become his best-known experiment/work, today the textbook example of the reconstruction of the term «silence» and awareness of sounds as the acoustics of space.

The concept of soundscape is nowadays especially scrutinised within the framework of acoustic ecology, which its founder Murray Schafer describes saying that "soundscape is any acoustic field of study" (Murray Schafer, 1994). This theory most frequently uses two approaches, the quantitative, involving the implementation of noise protection measures, and qualitative which involves the re-creation of sound, that is, treating sound as a resource of of artistic forming – acoustic design (Murray Schafer, 1994;Truax, 1984). These two approaches to the issues of sound and soundscape integrate in the way that they both share the objective to advance and optimise the quality of acoustic scenery. Today's sound studies develop in the direction of multidisciplinary research opened for the knowledge from various fields of study, from history to philosophy, sociology and anthropology; from medical studies to architecture, legal and technical sciences; from ecology to sound art, performance and media studies, etc.

II. DETAILS OF MULTIMEDIA INSTALLATIONS

The key to the choice of here presented multimedia installations are based in the presentation of a variety of audio materials and the approach to their forming. The multimedia installations presented are the Multimedia Installation Traditional Noise, the Multimedia Interactive Installation of the Function of Palm Playing (Virtual Organ), the Multimedia Installation Meditation Well and the Multimedia Interactive Installation of the Function of Finger Playing (Virtual *Sopile*).

2.1. Multimedia Installation Traditional Noise

This installation involves a 3D hologram projection of the *Zvončari's*(carnival bell ringers) mask which rotates around its axis in a slow tempo. During the projection of this hologram picture it will be possible to listen to the audio content through the available earphones. The audio content consists of the production re-design of the recording of the noise of bells that during the traditional annual carnival pageant is made by the bell ringers. "*Zvončari*" are best known as performers of pagan carnival magic. On their visits to neighboring villages they move in rows of two or three, merging towards each other, sounding their huge bells. "The sound is overwhelming and leaves one with a mixture of feelings, from excitement and fear, to curiosity and thrills" (see much more about that in details from: http://britishlibrary.typepad.co.uk/european/2015/02/love-it-or-hate-it-.html). In the cultural space of Viškovo and its surrounding area, the noise of *Zvončari* is defined in as "sound marks", i.e. distinctive sounds of traditional activities (Murray Schafer, 1994). It is with regard to this that this audio content is a significant sonic representation of ethnographic data.

The aim of this installation is to arouse new audio-visual sensations of ecstatic effect. The process of constituting the meanings of the audio-visual content while watching and listening to it has the potential of re-assessing the *Zvončari* tradition, thus shifting the

focus from visual experience to aural perception. It is precisely the shift of the hierarchical relationship of the visual over the aural that is the focal point that acoustic ecology scrutinizes, continuing the ideas of Steen Eiler Rasmussen, Danish architect and theorist, among the first to draw attention to the significance of "acoustic features of architecture in the integral experience of space", according to Rasmussen in 1964 (Oberman, ŠćitarociObad, Jambrošić, 2014).

2.2. Multimedia Interactive Installation of the Function of Palm Playing (Virtual Organ)

The Multimedia Interactive Installation of the Function of Palm Playing (Virtual Organ) has been devised to function on the principle of using palms to shade sensors that are within light beams. The light beams of different colors are directed vertically. Shading of a light beam generates a specific sound signal. All together there are six light beams, the system of which for the detection of the movement and the reproduction of the sound signal has been adjusted according the acoustic features of the six tones of the so-called Istrian scale (E-F-G-AS-B-CES). The interactive function of the installation gives the possibility to perform the Istrian scale tones, but also specific melody patterns of traditional songs. With this in mind it has been planned for the entry tickets to have on their back the instruction on how to «play» songs according to the proposed graphic solution. The multimedia installation of the function of palm playing consists of floor sensors for the detection of movements, ceiling orientated lighting in colour with sensors for the detection of movements, system of detection of movements and control of reproduction of music elements, system for recording in order to have music patterns archived and their reproduction subsequently obtained.

The concept of this installation is based on the consideration of technology as permanently changing and dynamic system of corresponding technical objects, social interventions and interactions. It is precisely such a combinatorial play that was enabled by the "device paradigm" according to A. Borgmann, actualizing the aspect of creative manipulation as a contemporary activity through which the relationship between reproduction and original, the audience and the players, education and media spectacle. What needs to be pointed out is the visual function of light beams. In the moment of shading with palms in order to obtain the production of sound, the beam of light vibrations changes into a beam of sound vibrations, giving simultaneously the possibility to have a visual experience of the sound.

2.3. Multimedia Installation Meditation Well

The Multimedia Installation Meditation Well has been devised on the basis of the concept of light and sound simulators of brain waves. In the physical sense the installation consists of a stone neck of water well. Within the neck of the well there will be a net of stretched strings from spun sheep's wool. With the help of the system for projection and lighting, the net will be in the focus of the light-play of dynamic changes.

The sound design of the installation involves the audio content of the "pink frequency" processed in the technique of binaural rhythm, in other words, stereophonic 'manoeuvre' of listening to different frequencies with the result of obtaining Theta brain waves in the range from 4 to 8 Hz that induce the state of deep relaxation, meditation and intuition. The principle of designing the sound picture will be based on the rule of the sensation of color of sound where it is not only frequencies and amplitudes of single harmonies of the composite audio-signal that are significant, but first of all the ratio of their frequencies, their reciprocal arrangement and distortion of the time of delay. Listening to the audio content is made through ear-phones parallel with looking through the neck of the well that will be closed by a glass surface.

This light and sound installation is in the function of stimulating brain waves. The idea of their stimulation has been prompted by the actual music practices of electronic music and ever more popular music-therapy approaches regarding what the sound artist BerhardLeitner terms a headscape (Ouzounian, 2006), in other words, a bio-space, that incorporeal part of a man which is researched and "conventional beliefs that consciousness is situated somewhere in the head reconsidered" (Toop, 2002). This installation has also been devised in the light of electronic shamanism that takes the listener «into the moving zone that Peter Lamborn Wilson described as "*sacred drift*" (Toop, 2002). In this context the symbol of the old well is a metaphor of the time in us and the "space that we inhabit in our daydream" (Bachelard, 1964).

2.4. Multimedia Interactive Installation of the Function of Finger Playing (Virtual *Sopile*)

The Multimedia Interactive Installation of the Function of Finger Playing of a musical instrument with the help of specially designed gloves enables generating music patterns. The gloves make it possible to connect contacts that are placed above the surface of finger cushions with the purpose of having music elements generated. The basic parts of that installation are gloves with contacts, the system for the detection of contacts and the control of the reproduction of music elements, the sound system, and the system for recording in order to have music patterns archived and their subsequent reproduction obtained. The aural result of music patterns on the traditional virtual instrument along with the performing characteristics will be adjusted with the characteristics of the traditional instrument –

sopile.Sopile is an ancient traditional woodwind instrument.

This installation is the result of scrutinizing Whitehead's idea that along with the development of smart machines technology has become an event itself. In the music world this event has gained a far-reaching significance especially so in the electronic and digital music where the synergy of the man and the machine has become the condition of creating. The machine has become the instrument and the other way round, the instrument has become the machine, the tool and the medium of creative play.

Virtual *sopile* here presented are interesting for the very reason they connect the new and the old. This is digital technology in the service of tradition, i.e., traditional sound. With the emergence of virtual instruments the traditional ones are reconsidered and created so that they can satisfy the requirements of musicians of the digital age – «metamusicians» (Sretenović, 2001). The playing of virtual *sopile*has been devised as a play of spontaneous actions and reactions with the aim of providing an experience of technological innovation in performing music. Bearing in mind enormous implications of industrialization and technification regarding the democratization of music and of making even the prospects of both artists and the public as producers and consumers, a new "generative audience" has been created (Tham, 2009).This generative audience has been enforced by digital knowledge and skills, motivated to take part in creative actions and games. The very idea of this installation has been lead by the idea of affirming the public.

CONCLUSION

The preliminary concept of the Audio Museum was devised in the spirit of the postmodernist world by the means of the audio-visual interpretation of digital reproductions and thereby determined philosophical and artistic consequences. It is yet to be seen whether it possesses the potential of leaving the mark in it and of what significance, however, there is the intention. It is with a great amount of creative enthusiasm that we worked on finding solutions, primarily those that in the manner of critical dialogue achieve the raising of awareness in the experience of sound as the entity of performing functions, which, unlike music, has in this regard been neglected.

We began from the premise that aural experience nowadays is in great deal marked by listening to music as "organised sound" in the sense of the term coined by E. Varèse. The confirmation of this is in the total invasion of (popular) music that is relentlessly produced and reproduced by digital technologies, aggressively occupying our soundscape with the consequential conventional experience. Each

conventional experience turns out to be the border of (non)acceptance of new challenges that needs to be re-examined and extended continuously. Applying the model of co-existing entities of performing functions, music and sound have been placed in equalized relation, confirmed by the here presented installations. Thus, the installations as the Virtual Organ and Virtual *Sopile*, acoustically adjusted to the so-called Istrian scale, provide the acoustic experience of "organized sound", while sound as a non-musical entity is present in the installations as the Traditional Noise (*Zvončari*'s noise) and Meditation Well ("pink frequency").

The denaturalization of music and emancipation of acoustic experience of non-organised sound on the one hand and acoustically designed multimedia installations of performing functions on the other, constitute main guidelines of the preliminary concept of the Audio Museum as a "virtual acoustic space" (Wishart, 1996). Last but not least, while working on the project the authors could feel the power of the borderline tension of scientific and artistic overlapping, but also raised the awareness of the ideological nature of every presentation.

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