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29 September - 3 October 2013
Michael Cacoyannis Foundation
Hellenic American College, French Institute of Greece

http://event2013.sd-med.org

BOOK OF ABSTRACTS
The SOUNDSCAPE APPROACH: INNOVATING URBAN DESIGN

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Summary
This paper aims to promote the soundscape approach, as a parameter of innovative urban designs, aiming at good quality of life. Sound quality perception is a part of a process of understanding urban space. Whereas vision has been established as the most important sense during the development of civilisation, the acoustic tradition has been diminished. Working group WG-4 ‘Creating and designing’ of the COST Action TD0804 entitled ‘Soundscape of European Cities and Landscapes’ is dedicated to disseminate existing experiences, to provide practical guidance and tools for the design and implementation of new and the preservation of existing soundscapes. This paper initially introduces the multidisciplinary characteristics of soundscape and the most important differences between soundscape and noise. It then examines case studies of good practice examples of soundscape application. Finally, it provides guidance for urban design and planning with applied soundscape methods.

1. INTRODUCTION
The perception of urban space quality is an information processing procedure where all senses and cultural factors intervene. Cities, lively and dynamic fabrics that develop from the assemblage of people for social and economic reasons, should be planned as harmonious and sustainable as possible. The United Nations predict that in 2050 2/3 of the world population will live in cities [1]. Urban architecture contributes to the organisation of perception and the feeling of place, through the aesthetics of the buildings, the urban structure and the confrontation between building and public space. Although the visual sense was made prevalent in the development of our civilization [2, 3], the sound component is still a relevant parameter in human perception of the outside world, explaining the feeling of discomfort or nuisance in many urban areas [4, 5]. Architects, urban planners and acousticians have a crucial role in defining and establishing pleasant urban environments.

Soundscape research represents this paradigm shift as it involves not only physical measurements but also the cooperation of human/social sciences to account for the diversity of soundscapes across countries and cultures. It is an alternative approach or complement to noise control engineering, considering the relationships between
the ear, human beings, sound environments and society [6]. Environmental sounds should then be considered as 'resource' rather than 'waste'. Sound management becomes important in understanding our feeling of different cities, where sounds from recreational or social activities, or even traffic, may contribute to a sense of liveliness as part of the city’s sound signature.

This paper aims to promote soundscape, as a parameter of innovative urban designs, aiming at good quality of life. This is achieved by a short review of the soundscape approach in previous research, methodology and application, and its investigation as a new tool in the academic process. It initially introduces the multidisciplinary characteristics and the most important differences between soundscape and noise approaches. Sound quality perception is a part of a process of understanding urban space. It then presents case studies of soundscape application as a part of the urban design process, in large urban centres. Finally, it provides guidance for including soundscape design in the urban fabric, in terms of architectural design (within a building and its cell), urban design (urban parks, squares, quiet areas) and urban planning (solids, voids, alternative means of transportation).

2. CREATING and DESIGNING the SOUNDSCAPE of EUROPEAN CITIES and LANDSCAPES – ACTIVITIES AND DEFINITIONS

Soundscape research is an inter- and trans-disciplinary field with studies that are not only related with the improvement of the current sound environment but also with the conservation of our sound environments, especially in cases where these are pleasant, thus acoustic heritages [7]. The working groups of the EU COST ACTION TD0804 ‘Soundscape of European Cities and Landscapes’ 2008-2013 are: (1) understanding and exchanging; (2) collecting and documenting; (3) harmonising; (4) creating and designing; and (5) outreaching and training.

The activities of Working Group 4, Creating and Designing, are mostly focused on practical implementation, on bridging the gap between theory and practice. The effectiveness of design changes, in terms of planning, landscape, urban design, architectural elements, and sound components, on the creation and improvement of soundscape, considering not only the acoustic changes but also people’s perception, is examined. The study of good practices for the implementation of soundscape research is pursued and discussed. Although most of soundscape research has been directed to outdoor spaces, the methods may also be applicable to enclosed spaces with similar function, mainly of public use, commercial and entertainment areas, transport interchanges, where the acoustic comfort and sound quality cannot be dealt adequately by noise parameters, which is the current practice. Five workshops have been organised by WG4 since 2010, addressing
soundscape design for sustainable urban development, exploring practical 
approaches towards better soundscapes, focusing on the preservation of soundscape 
in architectural/landscape heritage and in historic cities, discussing applications for 
implementing soundscape approaches to promote wellbeing and amenity, 
encouraging exploration of new ways of listening in local soundscapes, tackling 
noise and improving local soundscape quality. These workshops were also 
also included in the official programme of activities within the scope of the European 
Green Capital that the cities of Stockholm and Vitoria-Gasteiz were awarded in 
2010 and 2012 respectively.

WG4 also supported the activities within the ISO/TC43/SC1/WG54 "Perceptual 
assessment of soundscape quality" founded in September 2008, which seemed 
esential for a common language and understanding of the soundscape concept. 
According to the Handbook of Acoustic Ecology [8] soundscape is the acoustic 
environment as perceived and understood by the individual or by society and 
depends on the relationship between the person and any such environment. 
WG54’s task was initially to define the term “soundscape” and to 
develop a conceptual framework. Thus soundscape denotes the acoustic environment as 
perceived and understood by people, in context [9]. This definition is well in line 
with the tradition in soundscape studies [2, 3], as well as with the definition of 
“Landscape” in the European Landscape Convention [10]. It was also decided that 
it is necessary to distinguish between the acoustic environment, as a physical 
phenomenon where sound from all sources is modified by the environment, and 
soundscape, as a perceptual construct.

3. URBAN DESIGN PROCESS: The SOUNDSCAPE APPROACH

This section introduces the soundscape design approach as a parameter of the urban 
design process. The role of urban designers and planners, architects and 
acousticians is to approach, identify and propose the prerequisites for the creation 
of a pleasant soundscape, one that will contribute to good quality of life, 
considering the context.

The soundscape approach is different from that of noise control. Noise is a sound 
of discomfort and is considered a ‘waste’. According to the noise control approach, 
the human response to sound is related to its level, which is measured by 
integrating all sources, and managed by reducing it (the level). On the other hand 
the soundscape approach is referred to sound as a ‘resource’ [11], a sound of 
preference. Here, the preference is unrelated to the level, since quietness is not the 
objective. The soundscape approach requires differentiation between the sound 
sources, manages sound by identifying ‘wanted sound’ (‘wanted sound’ vs. 
‘unwanted sound’) and supports that activity creates liveliness and provides the
city’s identity. If one could categorize positive sounds, these would include the sound of water moving, sounds of nature (birds, insects, animals, wind), human sounds (steps, voices, laughter, songs). However, the most important criterion in identifying a ‘wanted sound’ would be the context (who, where, when, under which conditions). Therefore, managing the soundscape, either by preserving an existing soundscape or by creating a new where needed, is more important in the process of urban design and planning than the reduction of mechanical noise [12].

Often we find urban myths of good soundscape application [13], like for example the fact that whatever is related with water is positive or that quietness is the objective. Nature is rarely silent, street musicians and playgrounds are not silent and still pleasant. The soundscape design approach ought to predict the appropriateness of sound in respect to the space and the environment. Natural sounds with high levels can mask unwanted sounds, like traffic, and are often applied to urban parks, with positive reactions by the users, as in the case studies presented in Section 4. Still, in the process of selecting and applying a sound, the architect/planner/acoustician considers the space and the context, records the objectives (not in dB), identifies the sounds that will meet the users’ needs and organizes the design and the level of masking [15].

The macroscopic and the microscopic methods are used for soundscape design. The former involves ‘soundwalks’ in the particular space or area, at representative times a day, where recordings and measurements can be carried out. The latter focuses on interviews and questionnaires, mainly addressed to the urban space users. During this process artificial soundscape approach can be potentially used and assessed, as a tool to restore acoustically degraded locations and redevelop areas with uncomfortable annoyance and sometimes lack of human presence. Observational studies are always positive and encouraged.

4. SOUNDSCAPE DESIGN in PUBLIC INSTALLATIONS
This section illustrates four case studies where soundscape application was part of the design process of the urban/rural fabric with the common aim of providing good quality of life. Each of the places presented as a case study in this section was under remodeling/reconstruction due to social, economic or functional problems identified by its local society and was developed into a place of innovation.

4.1 Remodeling for Young and Old – Overcoming crime and drug use: Nauener Platz, Berlin
The case of this urban square is particularly interesting, since it enabled local residents and the authorities to transform an urban place, both literally and in terms of social interpretations. Its position within the urban fabric of Berlin, its local
importance as well as its characterization as a place of crime and drug use were some of the reasons the “Nauener Platz” evaluation was balancing between acoustic measurements, architectural planning, and the expertise from people living in the area to contribute to the reconstruction of the place. The Soundscape Project was a module of the Project “Nauener Platz-Remodeling for Young and Old” in the framework of the research program “Experimental Housing and Urban Development (ExWoSt)” of the “Federal Ministry of Transport, Building, and Urban Affairs (BMVBS)” by the “Federal Office for Building and Regional Planning (BBR)” [16]. Information of a new understanding and concept of a public place was underlying the development of the new soundscape, based on noise reduction and ‘audio islands’ playing the sound people like to live with in that area. Figure 1 illustrates the map and a photo of the audio islands that were installed. Due to the proximity of traffic, typical noise measurements were at about 75dBAeq, 40dBA, according to the position of the receiver. These were reduced by 3dB by the construction of a gabion wall at 1,35m. At the same time, the soundscape approach was interpreted by the use of audio islands, seating installations with built in headphones playing sound of the beach, birds or the city. Residents from all age groups, who also contributed to the soundscape design process through interviews, have enjoyed the new square.

Figure 1. Nauener Platz. Map of the area and photo of the audio islands after the remodelling.

4.2 Allowing access to the city centre – Increasing Tourism: Sea Organ, Zadar
The creation of the ‘Sea Organ’ in Zadar, a city of the coast of Croatia, was the result of a series of discussions of the local authorities regarding transferring the position of the disembarkation from large cruise ships. This decision was related with the need of direct access to the historic city centre, mainly for tourists. Architect Nikola Bašić designed part of the coastal promenade that lead to the city
with linear steps made of stone, where special holes created the first organ of the sea, illustrated in Figure 2. The ‘Sea Organ’ is 70m long and is divided into seven parts of thirty five tubes in a way that, according to the tube’s size and the speed of the sea wave, a musical note is emitted. The combination of many of these creates harmonic sounds [17].

![Figure 2. Aerial photo and views of the Sea Organ in Zadar.](image)

**4.3 Providing stimuli and didactic experiences – Giardino Sonoro Urbano, Milan**

This multi-sensory small urban sonic garden has been created in Parco Sempione, of the Triennale Museum of Milan illustrated in Figure 3. This project was realised after the collaboration of ‘Architettura Sonora’ and the Landscape Design Masters program of the Naba/Milano Politecnico, under the supervision of professors Elisabetta Bianchessi and Paolo Mestriner.

![Figure 3. Photos of installation area of Parco Sempione, Milan.](image)
It aimed at providing an open public space to the citizens of Milan, with didactic experiences, through purposely built interactive sound sources [18]. It soon became very popular to the public, which frequently visits it to enjoy sounds that are not common to the cities nowadays, providing a place for meditation.

### 4.4 Promoting art – ‘Peace Camp’, U.K.

This installation was organized in July 2012, in parallel with the Olympic Games in London. Director Deborah Warner was called to create a coastal installation that would encircle the United Kingdom in collaboration with the actor Fiona Shaw and Artichoke Creative Agency [19]. Eight whispering shiny camps simultaneously emerged in different coastal locations, designed to be accessible from dusk until dawn. The ‘Peace Camp’ was an exploration of erotic poetry and a celebration of the beauty of the coast. Figure 4 illustrates the proposed camp installation at Cemaes Bay in Anglesey, Wales, a photo and the plan of the equipment. The places selected were mostly rural, with cultural value, providing the opportunity of experiencing the installation from a boat along the beach's shores or by walking directly among the tents and grasses.

![Figure 4](image_url)

**Figure 4.** Aerial view and photo of the Peace camp at Cemaes Bay in Anglesey, Wales.

Natural sounds and erotic poetry are dominant of the soundscape produced as one walks in between the tents of the camp. These were selected to promote poetic tradition of the island. At the same time the users can interact with the camp through virtual environment techniques. The online version of 'peace camp' invites users to record their own reading of one of the site's poems, to upload literature, to take photographs, and to write messages and dedications, creating an anthology that celebrates languages, dialects and accents. For a limited time period, people can also listen to or download the soundscape online.
5. GUIDANCE for SOUNDSCAPE APPLICATION

Based on the discussion of Sections 3 and 4, this Section focuses on providing the professions involved with some guidelines derived from previous research on soundscape applications as well as with regard to the objectives of the soundscape approach. Major prerequisites of soundscape research and application are to comply with noise regulation, to reduce the effect of exposure, to provide good quality of life and to increase available restorative public space in the neighborhood. The concise design guidelines, which are an indication of future soundscape research plan, are presented here regarding three stages of the city’s/areas/neighborhood development process: the urban planning, the urban design and the architectural design. Soundscape mapping may play an important role here, by establishing different soundscape components.

At urban planning level, with respect to the above, the creation of “superblocks” like the example of Vittoria-Gasteiz is recommended, with minimum car admittance [20]. An approximately 400 by 400 meters new urban cell made of various street blocks is, namely, a superblock. Once multiplied at an urban scale, this new unit enables a reduction of private car infrastructures to the minimum necessary without compromising the urban organisation’s functionality. Whereas public transport and private cars would travel outside the superblock, people can move freely within it.

Moreover, new buildings positioned in noisy areas should act as noise barriers, with elevations that will not reinforce the tunnel effect. These buildings’ layout could position the kitchen, the wet areas and the public spaces at the noisy part. This layout can apply to most of the cases, even in existing building blocks. Living rooms and bedrooms can be positioned at the inner side of the block, facing an internal garden or a park. In this case the residents will have the opportunity to use this common area as a place of relaxation and play. At the same time limited numbers of bars and clubs within an area, the promotion of alternative public transport and underground motorways, and bicycle use can contribute to the reduction of health effects and to the improvement of quality of life.

Regarding urban design in detail, the application of soundscape can be interpreted in several ways: increasing vegetation can lead to the increase of natural sounds (birds), creating a water feature can mask unwanted sound in a public space. However, one needs to pay attention to possible clichés. Water features are not always positive. Quietness is not always about sound – quality of sound is more important. The principles or the concept of urban design should be based on the multisensory perception, use popular sound indicators and engage local communities to carry out soundwalks. During the design process, artificial sounds
that may be used for masking unwanted sounds should preferably be emitted through an installation (like seating), rather than be dispersed in the area. Also, consider alternative barrier designs is encouraged, for good quality of design of urban space, while reducing traffic noise in residential areas.

5. CONCLUSIONS
In this study the soundscape approach, as a parameter of the urban design process, was introduced and discussed. The multidisciplinary characteristics and the distinction between soundscape and noise were identified, case studies of soundscape application in the urban design process were presented and guidance for including soundscape design in urban and architectural design and in urban planning was provided.

It was indicated that soundscape planning can lead to successful urban design, by distinguishing the sounds that are perceived as pleasant and are in context with the place and with the human activities inside, and by defining the limits of audibility of the different sound components. Specific sounds may be enhanced, naturally or artificially, or undesirable sounds may be masked by superimposition. The advantages of applying soundscape design in the overall design process are social (local communities), economic (property value, tourism) and health related.

References


PRESENTATION of the EU COST ACTION: TD0804 “SOUNDSCAPE of EUROPEAN CITIES and LANDSCAPES”

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Summary
Research groups and experts working on various aspects of soundscape in 18 European countries joined efforts to set up the EU COST Action TD0804 ‘Soundscape of European Cities and Landscapes’ in late 2008, in order to collect data, harmonise concepts, optimise results and develop tools that could be used by different professions for the improvement of the sonic environment in urban and rural areas. During the four years the COST countries increased to 23, while 7 partners outside Europe also joined the Action. The main aim was to provide the underpinning science for soundscape research and make the field go significantly beyond the current state-of-the-art. The Action promoted soundscape into current legislations, policies and practice, aiming at improving/preserving our sonic environment.

The working groups of the COST action TD0804 were: (1) understanding and exchanging, aiming at investigating how the soundscape within its proper context affects its users; (2) collecting and documenting, aimed at organising soundscape data and the number of case studies using the soundscape concept for improving the living environment; (3) harmonising, aimed at the harmonisation of soundscape methods of research and relevant indicators; (4) creating and designing, aimed at the development of tools for practical use and implementation of the soundscape concept; and (5) outreaching and training, aimed at the dissemination of results and transfer of knowledge in terms of application of soundscape approach to urban environment and quiet areas.

The Action also supported the activities within the ISO/TC43/SC1/WG54 "Perceptual assessment of soundscape quality" founded in September 2008, which seemed essential for a common language and understanding of the soundscape concept.