



# Sonic urban furniture for vulnerabilities, experimental workshop in architectural design.

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## Abstract:

This publication presents the results, the processes and the methodology of a winter school workshop held between the National School of Architecture of Grenoble in France and the Department of Architecture of the University of Thessaly in Greece in January 2022. The workshop addressed the issues of sound, vulnerability and user exclusion and was aimed at participants with no particular background such as acousticians or audiologists. After three days of lecture sessions on the issues associated with waiting spaces, vulnerability and sound diffusion and propagation in space and materials, participants were invited to explore the production of spatial objects at the scale of the human body. The aim of the workshop was to design and build urban street furniture, on a one-to-one (1:1) scale, to communicate and express emotions with the user through the production of vibrations and/or sound and the passive acoustic qualities it creates, but at the same time be accessible by all users. The methodology of the workshop was based on theories of acoustics, ambiances, architecture and prototyping. Applying research by design methodology the participation team finalized and developed a final model that will be able to be built on a physical scale, namely that of the human body in movement.

## INTRODUCTION

During the last two years, architects, and designers, in collaboration with media, art companies (radio, television, theatre, street performers, musicians) and health institutions have been working on the role of sound in the constitution and development of individuals in the context of the B-AIR program (B-AIR, 2022, EACEA cultural program). B-AIR - Art Infinity Radio program aims to tackle this question by

creating sound art for babies, toddlers, and individuals belonging to vulnerable groups.

In order to tackle this issue, the group of architects of the B-AIR consortium decided not to differentiate the populations to which it is addressed and theorized that we are all situationally or temporarily found in a position of vulnerability (spatial, sonic and social) (Marchal T. and al, 2021). Several workshops bringing together researchers, architectural practitioners and artists (students in architecture, young professionals and sound designers) sought to reformulate these questions involving the approach of a designer, an architect or an urban planner when attempting to improve the accessibility of public space for all.

There are approaches regarding the designing process that take into consideration the participation of users, which many times have proven rather efficient, though sometimes the principles are difficult to be applied successfully when the user group is composed of disabled and not disabled, or elder and non elder users. In the design field, such methodologies are referred to as “Inclusive Design” and encourage designers to consider vulnerabilities. Though similar design approaches tend to follow expected methodologies during the design process (sketch - prototype - fabricate) without actually meeting the user group requirements or, the opposite, not managing a covering of needs of the rest of the groups, rendering a design unusable for all.

Through these workshops, we investigated the issue approaching social, environmental and spatial “vulnerabilities” theorizing that ambiances and sound concepts can be a design regulator that ties the vulnerability and design matters comprehensively. By understanding and integrating sound in the early design stages we investigated how to provide answers at scale, shape, materiality and use matters.

### **Vulnerability, inclusivity and exclusivity and objects.**

As the designing and use process progresses, gaps are created regarding the exclusion of users. Exclusion can be created in disabled or non-disabled, deaf or non-deaf, at all levels of use towards anyone. In the design process, the exclusion is often encountered as an expected fact of a design/product. The need for diversity and avoidance of exclusion, highlight the particularity of each individuality, that is, how one perceives the stimuli (sound or not sound), depending not only on the physiology and the capabilities of his sensory organs but also on one's cultural background and personal experiences.

This is why the "expected" and "naturalized" exclusion must be set to question understanding that policies against exclusions cannot be limited to the excluded or vulnerable social groups, but they concern a holistic transformative process in the

wider society, thus the possibility of changing the ethics of design by creating multimedia and easily accessible features at a universal level regardless of the medium and the field (audio, visual, spatial, etc.)

### ***The theme, the purpose and the sound medium***

Since 2013, the CRESSON winter school has formed a one-week research, laboratory and field work-oriented workshop that aims to investigate specific topics that are related to the sound environment, the sound studies and their social and environmental impact and its transformation. Since 2021 winter school in collaboration with the « B-Air art infinity radio » project supported by the Creative Europe Culture Program (EACEA) investigates sound vulnerabilities and the experience of listening.

During the last two years, the workshop is focusing on the social, environmental and spatial vulnerabilities and how those are amplified and remain neglected in today's world. The theme of the workshop suggested, «Listening to the world» as an active act, can be approached as a “posture of scaling facing the usual frames of reference and which allows us to pay more attention to vulnerabilities: namely how does the world sound to our ears? How does it sound when we are children? How does it sound when our bodies suffer and age? How does it sound when our senses or our beings are «different?»”(Marchal, 2021)

By focusing on the cultural and spatial aspects of the conception and perception of ambiances, architects, urban planners, artists, designers and inhabitants, conceive and occupy the public spaces of cities. The public space in use is a sound environment, as is a place of social interaction thus sound practices.

“How can we design public space and its furniture to be less vulnerable? How can a public bench become a waiting sound space, ready to be activated by an individual (a hearing impaired person, a group, a child, etc.)? How can these urban objects be designed and constructed to provide multiple, sensitive and multicultural listening experiences? What kind of « sound spaces in waiting» can be designed and built to give or bring attention to the vulnerabilities and pluralities of uses and spaces?”

(Remy, N. 2022)

The notion of ambiance and sound can be potentially the key investigation tool of this treaty, as sound is a medium capable of reframing these issues.

### ***The factors and the scale***

During the workshop activities, the first phases of the design were guided by experiencing the body in vibration and in listening. To consider that sound is a spatial and use regulator, it is necessary to investigate the scales of interventions in aspects. It is important to re-learn the dimensions of the moving body in public space in order to adapt the design of street furniture and more broadly the design of a space. It is not only a question of researching the most effective and relevant system but also of understanding through the direct perception of sounds and vibrations so as to better conceive the outcome and surrounding phenomena.

During the workshop week we focused on the means by which the environment is synthesized through sound. Spatial means, which can translate as materiality, shape and size and cultural means, which are the ways of use, by whom, how, why, and when. Designing with sound demands spatial interventions/objects where actions/uses can be welcome within the scenarios of use, all of which constitute sound characteristics, through passive or active methods, absorbing or reflecting acoustic qualities and use.



Figure.1, 2: Experimenting vibrations through different objects and materiality.

### ***Methodology and tools (lectures/seminars/ fabrication)***

The methodological approach of the workshop was interdisciplinary since the object/stake combines the themes of public space, design, sound and vulnerability. The references from which the laboratory draws information are those of design, architecture, acoustics, sound arts as well as the field of prototyping but also artists and researchers who emphasize issues of sound, deafness and sensory accessibility to sound stimuli. Considering that the phenomenological dimension of sound beyond listening includes the sensory dimensions of the auditory experience. Through this scope, we consider sound as sound as vibration, as a visual stimulus and as a spatial limit.

The workshop team consisted of 12 participants and several tutors. The participants were asked to develop and form a one-to-one scale structure at the end of the week. The workshop methodology was rooted through several lectures that were introduced during the first two workshop days regarding design, art, fabrication, materiality and listening matters.

The impact of the presentation helped the participants, on a technical and theoretical level in order to build up a perspective on the matter. A brainstorming creative design and testing process was evolved. Alongside, some creative design and idea investigation methodologies were inspired by the “Articulation-Limit-Inclusion” (Chelkoff, 2003) design approach. During the testing phase, semi-empirical methods of sound evaluation and simplifications of sound concepts, in order to communicate them to the participants, were used, along with hands-on experimentations. Simultaneously, different materials, tools, speakers, and amplifiers, were used in order for scale models to be produced and to experiment with their created qualities.

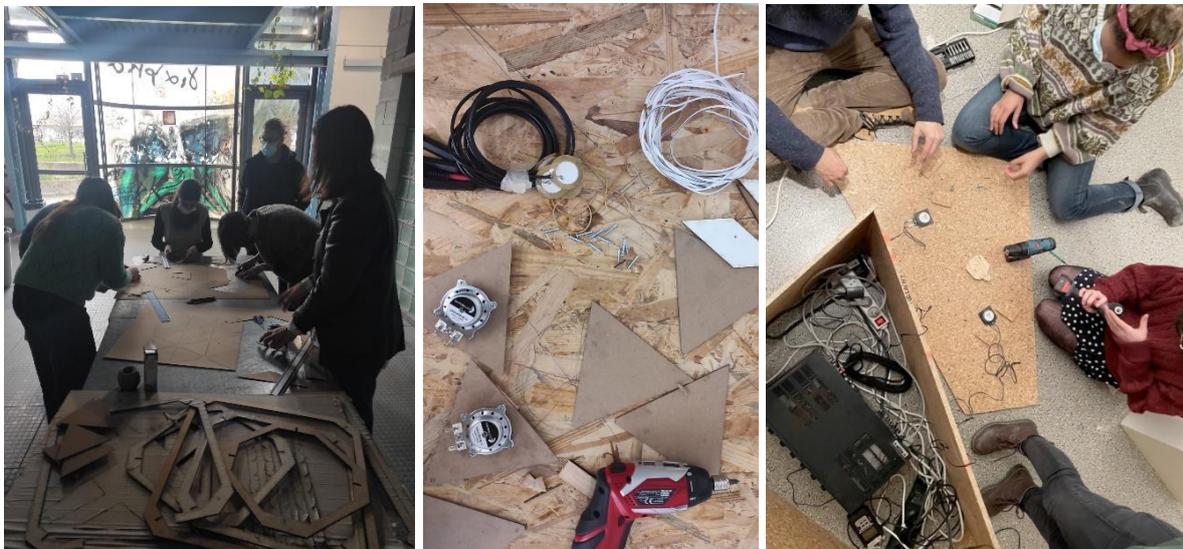


Figure.1, 2, 3: (left) sketch models are prototyping by using laser cutter prototyping tools (Volos), (mid) introducing exciters to the prototypes (Volos), (right) 1 to 1 scale model assembled to be tested (Grenoble)

Early design ideas were formed by the use of physical sketching, 3D modelling software and prototyping tools were encouraged for the development of the prototypes. During the early stages of the design process, laser cutting machines (EPILOG LASER 9000 LEGEND 36EXT) and 3D printers were urged. Thus, several models and ideas were produced in order for the participation team to accord and develop a final model that could be constructed in a physical scale by the participants/designers themselves (Marchal T. Chelkoff G., 2022).



Figure.3,4: sonic bench in test (left) isolate pavillon (right)

## CONCLUSION

The results of the two workshops are in a preliminary stage though the outcomes have been the subject of careful study and the test base so that a vulnerable individual can access them. All the above are challenging to resolve from an exclusively theoretical point of view. Nevertheless, the multidisciplinary interaction between science, technology and the arts makes it possible to decipher the blockages toward more open design practices. The return to the scale of the body in motion and the body scale will introduce creative design for all.

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