ReSilence

Retune the Soundscape of future cities through art and science collaboration

HORIZON- 101070278

D6.2

Pilot use cases and updated challenges from second round of art-driven experimentation

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Abstract
This deliverable outlines the projects of the artists participating in S+T+ARTS residencies, focusing on those who have formulated the pilot cases, as well as the requirements for each pilot from the second round of the artist Open Call. Additionally, it includes a short outline of the requirements evaluation/prioritisation methodology, as well as the evaluation and assessment methodology that will be followed by each artist.

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Author list

Organisation	Name	Contact Information
AUTH	Anastasios Tellios	ttellios@gmail.com
AUTH	Kalliopi Valsamidou	kalliopivals@gmail.com
CERTH	Sotiris Diplaris	diplaris@iti.gr
CERTH	Nefeli Georgakopoulou	nefeli.valeria@iti.gr
CERTH	Paraskevi Kritopoulou	pakrito@iti.gr
CERTH	Eleftheria Layokapa	elagio@iti.gr
CERTH	Christina Moskachlaidi	christina.moskachlaidi@iti.gr
MoBen	Maurice Benayoun	benayoun.maurice@gmail.com
TCH	Prodromos Monastiridis	pmonastiridis@tch.gr
TCH	Frosso Gaki	fgaki@tch.gr
MPIEA	Melanie Wald-Fuhrmann	melanie.wald-fuhrmann@ae.mpg.de
UNIGE	Antonio Camurri	antonio.camurri@unige.it

Executive Summary

This deliverable reports on the second set of user requirements for ReSilence, based on the profound analysis of the four Pilot Use Cases (**PUCs**): a) Musical Experience Design, b) The New Silence (Sound and Mobility), c) Sound of Urban Spaces and d) Full-body sound experience. A detailed exchange of ideas and expertise of ReSilence partners of the initial general challenges of the proposed PUCs has been performed, before coming to conclusion about the selected cases.

First, the deliverable briefly introduces the core challenges of each PUC as described by the artists from the second open call based on structured questionnaires and one to one online meetings with each artist. Furthermore, it explains how the outcomes of this deliverable will contribute to the progress of the project driving the design of the ReSilence in residency artists and the specification of each artistic project's main components.

In this deliverable each PUC is analysed under the terms of:

Separated by OC artist.

- **Artistic vision**: Which describes the artist's approach to the core challenges.
- **Prototype:** which provides a thorough documentation of the realisation of the artistic creation or prototype
- **Artist Story:** Which elaborates on how the PUCs can be implemented in real-life environments and defines the actors that are involved as well as the use of ReSilence components and technologies as well as the expected output of the prototype.
- **User requirements** which have been compiled so far. The user requirements describe the special requirements of the particular PUC and the artists' needs for the realisation of their vision from their interpretation of each core challenge and feedback from structured questionnaires.

The deliverable continues with the further analysis and aggregation of the ReSilence artists/user requirements from the second Open Call, which have been gathered from the artists with the use of structured questionnaires and their approach to each core challenge (PUC). The requirements are then classified into functional and non-functional and their importance is indicated by the MoSCoW framework. The deliverable concludes with an outline of the evaluation that will be used by the artists to assess their artistic interpretations for each challenge.

Abbreviations and Acronyms

AI	Artificial Intelligence
AR	Augmented Reality
DoA	Description of Action
EEG	Electroencephalography
HLUR	High Level User Requirements
PUC	Pilot Use Case
UR	User Requirements
VR	Virtual Reality

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1 INTRODUCTION

ReSilence is addressing challenges, mainly from the Urbanism/Mobility sector, while exploring the borders between music, noise, and user experience. The project will address real-world problems in urban settings through the collaboration of artists, creatives and scientists. These actors will co-create, co-operate and co-design AI & XR solutions that address social challenges.

ReSilence aims to identify social challenges and build trust and acceptance of novel digital technologies through art. The societal needs and challenges of each use case are going to be investigated to define the corresponding user requirements and ensure that ReSilence will be properly deployed in each artist scenario and will be evaluated by the end users that will experience it. In Section 1, the deliverable briefly presents the four pilot use cases and their core challenges as already described in deliverable 2.1 and updated in 2.2. In Section 2, the deliverable mentions briefly the pilot use case creation methodology, as well as the user requirement extraction methodology. In Section 3, the updated core challenges are presented as they have been formulated by the artists from the second Open Call, outlining the needs for the realisation of each artistic project. In section 4, the high-level user requirements are analysed and showcased, along with the aggregated final user requirements across all challenges. Lastly, Section 5 provides a brief overview of the artistic evaluations that will be carried out during the residency.

The goal of this deliverable is to elaborate on the challenges (PUCs) and elicit the appropriate artist/user requirements. The initial challenges, which were defined during the proposal preparation phase, are further developed and refined in this deliverable to create realistic and meaningful use case scenarios for each artist. Furthermore, the deliverable acts as a basis for the implementation of the PUCs with the requirements laid down in this deliverable. A clear plan of action can be created on when and how the pilot will run during the project lifecycle. The importance of this deliverable is clearly highlighted when observing the necessity that it produces in several other tasks. In particular, it will provide input for WP3, 4 and 5.

1.1 Pilot use cases core challenges overview

- **PUC1 - Musical Experience Design:**

This use case intends to examine how emerging technologies have the potential to redefine conventional music experiences and performances by incorporating technology-enabled audience interaction. The objective is to generate music and dance performances, as well as interactive environments that break away from the conventional. Collaboration among artists, technologists, scientists, architects, and designers will be needed to realise the innovative artistic visions. Through this core challenge, the goal is to reimagine the connection between performers, audiences and their environments, offering new perspectives in both physical and virtual music experiences. This approach stems from the notion that the public perception of AI and XR technologies can be positively influenced by thoughtfully integrating these technologies into artistic works.

- **PUC2 - The New Silence (Sound and Mobility):**

The rise of the industrial revolution led the way to a new era dominated by machinery, sparking a transformation characterised by the motion of mechanics. Within this transformative landscape, the concept of sound design emerged as a user-centric initiative, where functional sounds can evolve into catalysts for artistic innovation. The realm of electric vehicles presents a novel challenge, previously absent in auditory landscapes, while simultaneously offering the vehicle itself as a canvas for dynamic performance art. In such an approach, drivers possess the dual role of composer and performer, shaping the sonic environment as they navigate.

Furthermore, the reflective properties of surfaces play a pivotal role in redefining urban spaces and influencing material choices in construction. Architects and artists delve into the realm of indoor acoustic design, exploring the resonance of sound and its interaction with spatial dynamics. Building upon this knowledge, it becomes imperative to extend such principles to public domains like restaurants, subway stations and train terminals, treating them as potential musical instruments ready for enhancement through deliberate design interventions. The acoustic properties of these environments, including sound absorption and reflection can ultimately shape the overall experience of individuals within these spaces.

- **PUC3 - Sound of Urban Spaces:**

In urban areas, noise pollution is a significant concern that affects the well-being of its residents and visitors. As cities continue to grow and become more crowded, finding ways to manage and shape the soundscape of such environments has become increasingly important. While there's been growing interest in incorporating soundscape design into city planning, there's still a need for effective methods that address noise pollution. This involves developing innovative tools and techniques that architects and urban designers can use to create more pleasant and harmonious auditory environments.

The primary challenge in this use case lies in creating methods and tools that empower architects and urban planners to combat noise pollution, placing a special focus on concepts that draw inspiration from sound artists. Such an approach will involve the use of simulations and prototypes deployed in localised areas of urban landscapes, initially engaging a select group of individuals and progressively broadening to include wider cityscapes and communities.

- **PUC4 - Full-Body Sound Experience:**

This use case delves into the potential of vibration and tactile sensation in reshaping how we perceive both sound and visual stimuli. It highlights the importance of adopting a holistic approach to music and sound, one that engages not just the ears but the entire body and explores the concept of transforming physical objects into dynamic soundscapes and tactile experiences, drawing inspiration from artists such as Christine Sun Kim. Central to this exploration is the focus on individuals with hearing or visual impairments, seeking to repurpose technology to enhance sensory capabilities. By bypassing the impaired sensory organs, such as the eyes or ears, the aim is to redirect and redistribute sound and visual information through alternative pathways.

Expanding on this vision, the project aims to develop innovative technologies and techniques that utilise vibration and tactile feedback to alternatively convey both auditory and visual content. Through interdisciplinary collaboration and experimentation, the goal is to create immersive environments where individuals can engage with sound and visual elements in novel and meaningful ways.

2 METHODOLOGY

This section describes the approach that has been adopted to i) define the PUCs and scenarios and ii) specify the ReSilence user requirements.

2.1 Pilot use cases creation methodology

The PUC scenarios, which have been initially outlined in the proposal phase, were further elaborated in "*D2.1 Design needs and challenges in orchestrating the future sounds and experiences of cities*" and updated in *"D2.2 Design needs and challenges in orchestrating the future sounds and experiences of cities v2".* The starting point of the ReSilence PUC scenarios was the descriptions during the proposal phase. The main criteria, considered for the use case creation at that phase, were a) Musical Experience Design, b) The New Silence (Sound and Mobility), c) Sound of Urban Spaces and d) Full-body sound experience.

2.2 User requirements extraction methodology

To gather the user requirements that will drive the design of the ReSilence technologies offered to artists and the specification of the main components, a combined approach has been adopted. This approach has been articulated in various parts, to ensure the credibility and coherence of the procedure. The methodology followed for the elicitation and prioritisation of the requirements is extensively described in *"D6.1 Pilot use cases and initial requirements and challenges"*. Building upon insights from D2.1, the art driven methodology has been updated and further elaborated in "*D2.2 Design needs and challenges in orchestrating the future sounds and experiences of cities v2"* to feature four phases: Define, Design, Deploy, and Demo. The user requirements elicitation can be traced at the end of the Define giving input for the design phase.

3 RESILENCE CHALLENGES

This section elaborates on the four main challenges (PUCs) and the associated user requirements, which were defined by the artists from the second open call and have been extended during one-to-one online meetings, the physical meetings during the second plenary in Barcelona in M19, as well as the answers from the distributed structured questionnaires. Thus, each following subsection has provided several user requirements from ReSilence to make their UR elicitation processes faster and easier. The PUCs will finally assist in identifying the needs of the artists to realise their artistic proposal and assess the project's impact on the core challenges.

Regarding the structure that is followed, each PUC is analysed under the terms of an/a:

Separated by OC artist

- **Artistic vision**: which describes the artist's approach to the core challenges.
- **Prototype:** which provides a thorough documentation of the realisation of the artistic creation or prototype.
- **Artist Story:** which elaborates on how the PUCs can be implemented in real-life environments and defines the actors that are involved, as well as the use of ReSilence components and technologies, along with the expected output of the prototype.
- **User requirements** which have been compiled so far. The user requirements describe the special requirements of the particular PUC and the artists' needs for the realisation of their vision.

3.1 Musical Experience Design

3.1.1 Artistic vision / Brigitta Muntendorf

One of the central challenges addressed by project HABITAT is the issue of violence in society. By allowing the audience to enact different configurations of violence, positioning themselves differently to each other in the space, while evoking familiar images of violence, an awareness of the different facets and impacts of violence is created. This engagement can help deepen understanding of the root causes of violence. At the same time, these images of violence are transformed into something that embodies the idea of community and collaboration, highlighting alternative ways of interaction and social cohesion. The immediate artistic experience of resilience showcases ways in which people can collectively address challenges and support each other.

Project HABITAT aims to transcend traditional boundaries of audience engagement and narrative construction within the realm of immersive audio experiences. It will utilise the latest advancements in digital technology, such as AI voice clones and 3D audio spatialisation techniques, to redefine the roles of both performers and spectators. This innovative approach not only challenges the notion of conventional storytelling, but also seeks to blur the lines between creator and observer, inviting individuals to engage into a collective entity within an immersive sonic landscape.

Within this ambitious vision lies an exploration of the intersection between art, technology, and human experience. HABITAT aspires to leverage abstract imagery and thematic elements

drawn from science fiction literature to provoke dialogue. Audiences will be encouraged to navigate and interpret the sonic narrative landscape, facilitating a deeper understanding of the complexities inherent in human interaction.

3.1.1.1 **Prototype**

HABITAT will integrate a wide range of sensory stimuli, such as light, sound, text, and spatialisation techniques, converging to craft a captivating and immersive environment. These elements aim to empower participants, allowing them to actively mould their own unique experiences. By incorporating AI voice clones and the utilisation of multiple communication channels, the project presents a dynamic platform for artistic expression and engagement with the audience.

3.1.1.2 **Artist Story**

HABITAT will debut at the Ultraschall Festival in Berlin for real-world testing and refinement, presenting an immersive and participatory "3D audio space requiem" experienced through 24 loudspeakers, AI voice clones and audience participation. Notably, there will be no involvement of singers, musicians, or actors in this requiem. The singers are AI Voice Clones and the audience itself becomes the performing entity, by navigating through a complex guidance system of language, text, light and sound and creating abstract images at specific moments through different constellations in space. These are constellations of violence that open up a wide variety of reference systems between the group and the individual and can change their meaning through the smallest changes, such as a change in viewing direction or shifts in the positioning of the audience and sound. The audience thus forms the group of actors, but at the same time they are also the stage set and scenery of the sonic narratives.

HABITAT consists of two distinct components: a performing audience and a participating audience. In the initial version of HABITAT, the performing audience consists of 20 individuals who navigate a field surrounded by 24 loudspeakers. Equipped with bone-conduction headphones, this group experiences a unique blend of AI-Voice Clones integrated with ambient sounds from the loudspeakers. While some AI-Voice Clones provide instructions or details about the environment, others will contribute to the artistic narrative. Through a combination of light, sound, text, and spatialisation techniques, HABITAT will construct a multifaceted system of storytelling, simultaneously aiding the audience in orientation and navigation.

3.1.1.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_1.1	Parallel communication lines with 20 people, or to address people individually via headphones during a performance

UR_1.2	Use Interactive Sonification of Human Movement Qualities to see the interaction between movement in space and sound
UR_1.3	Use text generation and emotional recognition to project words on the walls
UR_1.4	Divide audience based on sounds
UR_1.5	Create AI voice clone
UR_1.6	Capture outside 3D audio

3.1.2 **Artistic vision / Wen Liu & Alexander Hackl**

Project 'Uncanny Reverie' is approaching a multifaceted challenge, not only confronting the realities of climate change, but it also aims to convey its significance in a way that resonates with audiences without overwhelming them. At its core, the project envisions creating a musical composition rooted in environmental themes. The project is creating a concert with interactive elements. The audience will be engaged to be part of the composition and performance of live music. Gaming concepts and generative storytelling will be used to deeply immerse the audience into the experience.

'Uncanny Reverie' envisions creating an artform that changes the roles of composers, musicians and audience. As the concert is no longer separated into an active and an inactive part, inclusion is one of the main principles of the work. Furthermore, the UI and UX will be created in a way that makes the experience accessible to a large audience.

3.1.2.1 **Prototype**

The anticipated prototype will be a live, interactive AI music generator that creates real-time audiovisual projections and music scores for each musician participating, based on audience voting data. An accompanying app will facilitate live audience participation and voting, dynamically altering performance narratives with each round of voting. Additionally, an AI-generated voice acts as the moderator throughout the performance. The live performance will feature the following instruments: flute, clarinet, electric organ, percussion, and violin, performed by Ensemble NAMES.

3.1.2.2 **Artist Story**

The narrative of ‘Uncanny Reverie’ unfolds across three chapters. First, “Theatrical Composition”: This composition will be shaped by audience input, an AI generator, a climate-focused storyline, and the original creativity of the artists. This dynamic will result in a unique theatrical experience. Second, “Audience Engagement”: The audience will actively shape the performance through live voting and responding to questions using a dedicated App. Real-time data collection and analysis of audience responses will determine the direction of the narrative and trigger subsequent questions, effectively steering the overall storyline. Additionally, voting outcomes decide which pre-composed collage score is next displayed on each musician's iPad, thus influencing the live music dynamically. This interactive system will ensure that each performance offers a unique narrative and musical experience, distinctly moulded by the audience's choices. Finally, "Theatrical Climate Storyline": The overarching

narrative is centred on climate change, evolving in response to the audience's understanding and choices. This approach enables the storyline to reflect the collective input of the audience, ensuring a dynamic and engaging experience.

3.1.2.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_1.7	Web based Systems to help with connecting Technologies with the API to Interfaces
UR_1.8	Image to Music and Text to Music
UR_1.9	Music generating AI to be controlled by a user-friendly web interface
UR_1.10	Text to Image to generate music in the form of patterns or spectrograms
UR_1.11	Integrate a music generating model into an automated, user-friendly system

3.1.3 **Artistic vision / Kakhidze Alevtyna (Starting in May 2024)**

Beginning her residency in May 2024, the artist plans to delve into the correlation between colour and sound, in order to create innovative sound navigation systems tailored for the visually impaired. These systems will utilise colour recognition technology to enhance accessibility and empower individuals with visual impairments to navigate their surroundings with increased independence.

3.1.3.1 **Prototype**

The project seeks to craft soundtracks derived from colour data gathered by local youth, highlighting the distinct sonic characteristics of various locations and buildings. Furthermore, it seeks to develop sound navigation systems for the visually impaired, enhancing accessibility through innovative use of sound and colour recognition technology.

3.1.3.2 **Artist Story**

The project will involve showcasing results at exhibitions and events in the Netherlands, Belgium, and Ukraine. The engagement of local youth in data collection and the creation of soundscapes will be highlighted, ensuring ongoing collaboration and refinement of the project's outcomes through regular workshops with participants.

3.1.3.3 **User requirements**

Given that the artist will start work on their project in May 2024, the user requirements presented here are based on an analysis of the artist's proposal.

User Requirement	Description of Action (DoA)
UR_1.12	Develop sound navigation systems for the visually impaired

UR_1.13	Collect colour data
UR_1.14	Associate colours with Sound

3.1.4 **Artistic vision / Lugh O'Neill**

The project "An Ephemeral Spatial Sound Environment" will allow the audience to experience and engage with music in new ways – spatially, with their body, their movement and by engaging with a space as well as the sound presented. This will emancipate the listener who is perhaps used to being seated or standing facing a stage in musical experiences. The listener becomes a part of the narrative and of the composition by choosing their own trajectory through a musical work which is composed in space as well as in time. This is achieved using generative composition, audio spatialisation and architectural solutions.

3.1.4.1 **Prototype**

The project will result in the design and creation of a space for versatile musical and audio experiences. This will be the product of the collaboration between Lugh O'Neill and Temporary Pleasures - Lugh bringing a spatial sound-system and his knowledge of that field, and Temporary Pleasures bringing their expertise in architecture and a team which is prepared for the realisation of such a project. The space will host an artwork by Lugh O'Neill that explores a narrative reflection of the context of the project, introducing topics of spatiality, engagement with acoustic landscape and DIY approaches to music device making and hacking. The space will also host a series of concerts and versatile audio events which will showcase the broad and multi-disciplinary potential of this novel architecture for spatial music formats.

3.1.4.2 **Artist Story**

The project will encompass community engagement and the development of inclusive and collective physical experiences. It will feature architectural and spatial sound installations, musical events, and diverse participatory audio experiences. A unique design and space to musicians will be presented and performance artists will be encouraged to perform their work within it, adapting to the architecture and diffusing their audio on the spatial sound-system, offering support as necessary. Social inclusion will be addressed through the architectural challenge of providing easily constructible spaces for a more diverse range of audio artforms and musical gatherings. Sustainability would be addressed by the SME's practice of using reusable standardised construction materials. Accessibility would be one of our main objectives, which is aimed to be reached by giving access to new technologies for audio creation such as audio spatialisation to a wider range of artists.

Developing new designs for spatial sound systems could remove the typical hierarchical relationship between performers and audience in standard (stereo) concert settings. Architectural solutions for venues catering to a wider array of musical art forms could address the scarcity of available spaces for emerging practices. They would also break down the barriers between art forms currently segregated into different categories and institutions.

3.1.4.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_1.5	Real-time analysis of full body expressive movement could be used in collaboration with performers who would be part of the public programme presented in the new space
UR_1.16	Use Generative AI composition tools
UR_1.17	Create Self-made spatial audio tools

3.2 The New Silence (Sound and Mobility)

3.2.1 **Artistic vision / Abel Korinsky (Also PUC 3: Sound of Urban Spaces)**

"Resonance" centres on sound-based information dissemination and alert systems tailored for urban environments, particularly focusing on mobility. Based on research and datasets, the artist will simulate an urban environment equipped with technology (ultrasound directional speakers) that responds to people's movements and nearby obstacles individually. The project's objective is to advance Soundscape technology, enhancing safety, mitigating noise pollution, and offering personalised sound experiences. It is dedicated to refining sound-based information dissemination and alert systems for urban spaces.

3.2.1.1 **Prototype**

"Resonance" will be realised as an immersive installation, utilising cutting-edge technology such as Open MV AI cameras and LiDAR sensors along with Imaginary and futuristic renderings/animations displayed on the walls in order to simulate a pedestrian experience within vibrant urban environments. Additionally, the installation will incorporate ultrasonic speakers capable of emitting directional sound beams, dynamically tracking individuals as they move through space. This innovative approach aims at enhancing safety but to also add an element of interactivity, engaging pedestrians with personalised audio and visual experiences tailored to their movements. Through this fusion of technology and artistry, "resonance" intends to transform urban landscapes into dynamic, sensory-rich environments, offering a novel way for individuals to interact with their surroundings while prioritising safety and engagement.

3.2.1.2 **Artist Story**

The project proposes a possible future, where listening experiences are personalised and dynamically adjusted based on real-time human feedback. For the exhibition, a surround sound system (Ambisonics) will envelop visitors in a virtual soundscape of an urban cityscape. Imaginary and futuristic renderings/animations will be displayed on the walls, demonstrating how information dissemination and alert systems interact with inhabitants and showing an abstract interconnectivity. Cameras, often envisioned in dystopian future scenarios, are being replaced by strategically placed speakers throughout the space, serving as a field of

information and alert systems to create a safer urban city space. In this manner, the audience becomes directly involved and takes on a participatory role in the project. By creating their "own" soundscape, they also experience it directly.

3.2.1.3 **User requirements**

We envision ReSilence components that provide the following functionalities based on the artist needs:

User Requirement	Description of Action (DoA)
UR_2.1	Track emotions of pedestrians based on urban sounds and images by EEG or interactive sonification of human movement
UR_2.2	Use mobile EEG in real to get real time data
UR_2.3	Track movement of the loudspeakers

3.2.2 **Artistic vision / Paul Louis (Also PUC 3: Sound of Urban Spaces)**

The goal of the “Biomimetic Network of Sound for Future Cities” project is to reduce sound pollution in cities by addressing the noise emissions from mobility devices such as cars and scooters. The idea is to develop state-of-the-art algorithms capable of minimising unnecessary sound frequencies while instead promoting curated sound emissions inspired by nature's biophony and proven systems.

3.2.2.1 **Prototype**

The project's narrative will be articulated in several renowned events such as ZKM in Karlsruhe, Sonar in Barcelona and the Science Festival in Genova (Casa Paganini). Establishing partnerships with local businesses and organisations, the initiative invites participants to immerse themselves in transformative experiences, blurring the boundaries between art and technology. Prior to the first installation, a test at a designated venue will be conducted as an experiment showcasing the soothing and health-promoting impact of the project’s sound algorithm, validated through scientific methodologies in collaboration with MPIEA.

3.2.2.2 **Artist Story**

The project intersects with both PUCs 2 and 3, as it involves direct cross-communication and interdependence. It will allow the local community (including exhibition visitors) to directly explore the pollution aspect of sound and its origins, while also offering suggestions for solutions. Furthermore, within the context of the algorithm for entire cities, the local community will play a crucial role in informing the main algorithm, thus shaping their own city's soundscape.

3.2.2.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_2.4	Separate sound frequencies
UR_2.5	Use Data streams to inform directly the sound synthesis
UR_2.6	Create algorithm that is capable of silencing specific sound frequencies while promoting others

3.3 Sound of Urban Spaces

3.3.1 Artistic Vision/ Marcin Dudek, Lieven Bertels & Mark Buman (Steps and Marches collective)

“Home Field Advantage” intends to analyse football match chants as a social phenomenon by multidimensionally exploring the collective dynamics of stadium crowds. It aims to investigate the relationship between audience sound production and emotional response. The project will collect data from large-scale football matches in Tottenham Hotspur stadium, to comprehend and manipulate the intricate relationships and community building within and around the stadium. With a focus on understanding crowd dynamics and emotional response, the vision extends beyond mere noise management to encompass a holistic exploration of the stadium's impact on its surroundings. This involves delving into the interplay between human movement, emotional responses, and architectural structures along with their materials aiming to transform soundscapes into tangible and interactive experiences.

3.3.1.1 Prototype

The project will generate sound recordings and VR simulations of crowd chants to investigate their impact on individuals. Through data analysis and field research at Tottenham Stadium, the project will explore the social implications of stadium architecture on crowd behaviour, informing artistic reflections. The anticipated outcome will include immersive and interactive sonic experiences that transcends traditional boundaries of perception. By translating human movement and emotions into sound, the project aims to build a narrative that resonates with the choreography of fans and the pulse/vibrations of the stadium. Through innovative use of compact microphones and strategic positioning, the team seeks to capture the diverse soundscape of the stadium, from the vibrations of steel beams to the absorption of sounds by glass fences. Ultimately, the prototype envisions merging sound with sculptural installation. Technologies such as Audio to Image & Image to Audio and Interactive Sonification of Human Movement Qualities will aid the project in navigating between recorded sounds and images, facilitating new forms and deeper comprehension of collected data.

3.3.1.2 Artist Story

The project will be presented at OOF Gallery's Winter 2024 exhibition program, located within Tottenham Hotspur Stadium. The gallery's extensive network and in-stadium promotion will ensure widespread visibility. The project will conduct extensive testing at the Tottenham Hotspur Stadium, a venue vibrating with the energy of approximately 65,000 football fans,

including local supporters and visiting fans from opposing teams. These tests will take place before, during, and after significant football matches, using multiple types of microphones at multiple strategically picked locations. Recording sessions, overseen by Mark Bergman, will capture the crowd behaviour and its impact on stadium architecture and materials highlighting the intricate relationship between sound, emotion and space. As insights emerge from the recordings, the team will translate raw data into compelling narratives, exploring the symbiotic relationship between stadium activities and its surrounding urban environment.

3.3.1.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_3.1	Identify patterns to understand the full emotional spectrum of the crowd using sonification of human movement qualities
UR_3.2	Use contact microphones to capture vibrations in the infrastructure
UR_3.3	Use Audio to Image & Image to Audio to create images from sounds from the stadium crowds
UR_3.4	Use the Brain and Emotion Laboratory at MU, to do an MRI to scan the artist's reaction to the sounds recorded
UR_3.5	Use Audio-to-Haptics technology that converts sound into haptic feedback in real time

3.3.2 **Artistic vision/Ari Benjamin Meyers (Also PUC 1: Musical Experience Design)**

"Invisible choir" involves breaking down the challenge of redefining urban sound design into manageable components. The project aims to use musical interventions in public space to address and mediate conflict, disagreement and misunderstanding by creating a collaborative musical environment for people to participate in. Modern society is overly influenced by the ill-effects of social media which tend to emphasise and exacerbate division between individuals and labelled groups. Creating music together can perhaps transcend or at least help to minimise these effects and encourage listening to each other rather than speaking past each other. The aim is to explore how technology, such as AI and XR, can facilitate new forms of interaction in public spaces. It envisions creating immersive sonic experiences that transcend traditional gallery spaces, reaching a diverse audience through innovative technology. The project aims to harness AI and participatory composition to foster collaboration between artists, the public, and machine intelligence, pushing the boundaries of what is possible in sound artistry. The local communities' personal contributions will be critical to the project since their participation will catalyse the project's outcomes. AR and mobile technologies will allow the interference with anyone who has a smartphone and is willing to share geo-located audio interventions in order to incorporate their audio-based contributions into a collective, evolving composition.

3.3.2.1 **Prototype**

The expected outcome is a series of interactive installations that encompass art, technology, and human creativity. By incorporating AI-driven audio classifiers, pattern recognition algorithms, and voice cloning techniques, the project seeks to create dynamic compositions that evolve in response to participant input. Utilizing web-based platforms and mobile applications broadens the project's outreach, enabling extensive audience engagement and facilitating feedback collection from a wide audience.

3.3.2.2 **Artist Story**

The project will enhance the existing open-source Roundware audio AR platform by incorporating both experimental and production-based new features to ultimately deliver the final work. At this stage of the project those include. Building a feature to allow geo-located audio content to be released to the public on a timed schedule. Additionally, it will allow for geo-located “sound objects” to move through space over time on a prescribed path or based on a prescribed algorithm. The system will connect with external data sources such as weather data, which will influence the paths and patterns of sound objects released into the system. Furthermore, it will allow for directional audio as well as geo-located audio to increase immersion for participants.

The projects aim to create a work that could exist within a museum or gallery space as well as in a public space. Audio inputs will be collected audio from strangers, most likely in the form of a simple sung melody or phrase, and then use AI to analyse them, identify the similarities and differences and use that knowledge to “compose” an evolving piece of music, that in turn can be rehearsed and further modified by participants. The project is also interested in understanding the psychological and neuroscientific effects collective music-making can have on social relationships between strangers, intending to be able to maximise the prosocial impact of the project. Additionally, various audio-focussed AI models will be employed to analyse audio inputs from participants, extract patterns of similarity and difference and use those as drivers behind the creation of new forms of collective musical expression will be used.

3.3.2.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_3.6	Build feature for an AR platform to allow geo-located audio content
UR_3.7	Create geo-located “sound objects” that move through space over time on a prescribed path or based on a prescribed algorithm
UR_3.8	Connect with external data sources such as weather data which will influence the paths and patterns of sound objects released into the system

UR_3.9	Audio-focussed AI models to analyse audio inputs from participants extract patterns of similarity and difference
UR_3.10	Web-based Systems for Real-time and Mobile Feedback - on by mobile devices for real-time feedback both from participants as well as from external dynamic systems
UR_3.11	Isolate specific sound frequencies

3.4 **Full-Body Sound Experience**

3.4.1 **Artistic Vision / Guillem Serrahima (Also PUC 3: Sound of Urban Spaces)**

An urgent concern in urban landscapes is the proliferation of electromagnetic frequencies, accompanied by a corresponding surge in information and noise. This increased presence poses complex challenges for both humans and non-human species in these environments. The overwhelming number of electromagnetic signals and information overload can lead to sensory overload and cognitive strain, potentially impacting the well-being of individuals and ecosystems alike.

"Ubiquitous Noise" aims to involve the local community of a selected European city in actively investigating the effects of electromagnetic frequencies on their personal, professional, and social lives. This will take the form of interviews, collaborative information gathering and anonymous submissions. The goal is to raise awareness about electromagnetic pollution among more people and position it as a defining characteristic of today's networked urban areas.

3.4.1.1 **Prototype**

Designed to fully engage the observer's senses, the artwork will take form as a multi-channel audiovisual installation. Its objective is to illuminate the complex interplay between heightened synchronisation and heightened disorientation. Through the installation, the artist intends to capture instances of hypersensitivity, providing a clearer understanding of the profound impact of artificial electromagnetism on human perception and non-human experience. The plan includes creating a movie with different concepts each time, with sound driving the montage and determining the sequence of visuals. By employing abstract sounds, we aim to draw connections that effectively portray the nuanced impact of electromagnetic pollution.

3.4.1.2 **Artist Story**

The artist will collaborate with scientists from the Green Bank Observatory, who conduct research in an environment free of artificial electromagnetism aiming to clarify the impact of the absence of artificial electromagnetic frequencies on scientific research. Through the collaboration with scientists the project seeks to deepen the understanding of the impact of artificial electromagnetism, striving to clarify its effects on urban residents who exhibit sensitivities to electromagnetic exposure. Moreover, it will also seek to engage experts in

discussions regarding the potential influence of electromagnetism on animal and bird behaviour.

Simultaneously, real-life instances of reactions and sensitivities to artificial electromagnetism among urban residents will be examined through surveys conducted in European cities. The project will use three datasets: 1. Data from the astronomical observatory, 2. Existing collected data 3. Data from experiments from people with disorders. Additionally, research efforts will extend to investigating potential effects on non-human species, drawing upon expertise from zoologists, ornithologists, and entomologists. This approach aims to deepen our understanding of multifaceted interactions between artificial electromagnetism and various aspects of urban life, informing strategies for mitigating its potential adverse effects and fostering healthier environments for both human and non-human inhabitants.

3.4.1.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_4.1	Use Audio to Image and Image to Audio to generate visual material based on the sonic data collected at Green Bank observatory
UR_4.2	Generate sonic material based on visual recordings
UR_4.3	Sound to drive a video montage, what scene comes next
UR_4.5	Build a model that can organise images based on sounds

3.4.2 **Artistic Vision / Lea Luka Sikau**

Trusting our guts entails aligning with our intuitions. The project aims to reestablish a connection with our inherent intuitions and bodily sensations, acknowledging the silent guidance they provide in navigating our daily lives. Despite their significance, we often overlook their voices, resulting in a disconnection from our own bodies. The project tries to create a 'safer space' in which to attune to one's body on their own terms. As such, it explores the aural diversity of gut sound in vibration, sound, smell and light. By fostering a deeper connection with our internal organs, the project nurtures an attunement to oneself which often elicits affective or even emotional reactions (such as stomach grumbling and literal physical attunement to the sounds perceived).

3.4.2.1 **Prototype**

"The gut rehearses to tell you something," will take the form of a multi-sensory, interactive fountain sculpture. This innovative artwork will amplify the sounds of intestinal motion, transforming typically silent bodily processes into tangible, audible expressions when interacted with. Through the integration of inflatables and water layers, the installation will

invite audience members to engage in a network of multi-organ communication and tactile entanglements, providing a distinctive insight into the inner workings of the body.

3.4.2.2 **Artist Story**

The project seeks to transform audience perceptions of their internal bodily relationships while destigmatizing gut sounds. Additionally, it intends to conduct a study at the MPIEA ArtLab and facilitate a prototyping session for the interaction design at Casa Paganini.

3.4.2.3 **User requirements**

We envision ReSilence components that provide the following functionalities, based on the artist needs:

User Requirement	Description of Action (DoA)
UR_4.6	Use Interactive Sonification of Human Movement Qualities to record and measure Gut Movement
UR_4.7	Use tactile sound to translate gut sounds into vibration
UR_4.8	Create sounds and vibrations in different forms and intensities

4 ANALYSIS OF RESILENCE REQUIREMENTS

The following table (Table 1) accumulates the user requirements that have been developed from the second Open Call artists reflects updates and additions to the user requirements elicited from the use cases and user requirements resulting from the second artist open call. All high-level user requirements stated in D6.1 are still valid. In Table 2, we present the complete list of the detailed user requirements along with their associated relevant HLUR. This table contains mainly input from *"D6.1 Use cases, requirements and evaluation plan"*, while it additionally includes the updated and new user requirements, as they have been formulated from the artists from the second open call. Tables 1 and 2 also illustrate the type of each requirement (functional or nonfunctional), as well as its priority, as specified by the users involved in requirement elicitation. The updated UR are noted e.g. UR_XX is numbered as UR_XX.1, while the new UR added are numbered as UR_20+1 and indicated in blue colour.

Final HLUR	1st Open Call Artist Requirements (D6.1)	2nd Open Call Artist Requirements	Final HLUR Title	Final HLUR Description
HLUR 1	2.1, 3.6, 3.10,3.11 3.19	UR_2.4, UR_3.11	Processing of audio files	Artists can isolate sounds of their choice in multiple frequencies, as well as analyse specific sound qualities
HLUR 2	3.3, 3.4, 4.2 4.1, 4.8	UR_1.3, UR_1.7, UR_15, UR_2.5, UR_3.5, UR_3.8, UR_3.10	Real time data analysis and feedback	Artists can use real time data Analysis feedback to directly adapt and assess their prototypes
HLUR 3	2.3, 3.5, 3.7, 3.8, 3.12, 4.3 4.4, 3.24	UR_1.1, UR_1.2, UR_1.6, UR_1.13, UR_15, UR_3.2	Multiple data and signal collection	Artists can record, track and measure physiological data as well as signals of movement
HLUR 4	3.9, 3.13, 3.16, 3.23 3.15, 4.8	UR_1.14, UR_2.1, UR_2.2, UR_2.6,	Multiple data and signal	Artists can analyse data from online

		UR_3.1, UR_3.4, UR_3.9, UR_4.8	analysis	sources, physiological data as well as signals of movement
HLUR 5	2.3, 3.7, 3.21, 4.2,4.1	UR_1.1, UR_1.14, UR_4.3, UR_4.5	Data synchronisation	Artists can utilise synchronised sources of data inputs and outputs
HLUR 6	2.2, 3.17, 4.7, 3.20, 3.23	UR_1.10, UR_2.6, UR_3.3, UR_4.1, UR_4.2, UR_4.6, UR_4.8, UR_1.9	Data translation/visualisation	Artists can externalise/visualise capture sonic and physiological data
HLUR 7	1.3, 4.5, 3.22, 3.18	UR_1.3, UR_1.11, UR_3.10	Artistic installation user feedback	Artists can collect and analyse user feedback after they experience their installation
HLUR 8	3.1, 3.2		Audio recording quality	Artists can have audio files of high quality (to be defined) and of at least 2-3 minutes duration without disruptions
HLUR 9	3.9, 4.6	UR_3.5, UR_4.7	Wearable sensor positioning adaptation	Artists can adapt the positioning and quantity of wearable sensors to allow as free movement to the end user as possible
HLUR 10	1.1, 1.2		Aesthetic evaluation of sound and experience	Artists can use scientific methods to explain the psychological, neuronal and socio-cultural basis of aesthetic perceptions of sound and music

HLUR 11		UR_1.5, UR_1.8, UR_1.9, UR_1.11, UR_1.16, UR_1.17	Use generative sound models	Artists can use generative AI models to create music, voice clones and musical compositions
HLUR 12		UR_2.3, UR_3.6, UR_3.7	Geolocate and track objects and sound sources	Artists can be able to geolocate humans, objects and sound sources through APIs and apps
HLUR 13		UR_1.4, UR_1.12	Sound navigation system for audience including visually impaired	Artists can use sound navigation systems to guide and audience in groups or assist guidance of the visually impaired

Table 1: Analysis of the High-level user requirements

In Table 2, we present the complete list of the aggregated artist user requirements associated with the relevant HLUR(s) across all PUCs. When common needs are present across requirements, URs are merged into one. The table also illustrates the type of each requirement (functional or non-functional), as well as its priority based on the MoSCoW framework.

Artist/User Requirement (UR)	Associated HLUR(s)	Role	Detailed description	Functional or Non-Functional (F/N-F)	Priority based on MoSCoW framework
UR_1.1	HLUR 7, HLUR 10	As an artist I want	To assess the psychological, neuronal, socio-cultural and emotional basis of aesthetic perceptions of music and sound and images in outdoor or indoor settings	F	S
UR_2	HLUR 8	As an artist I want	A system that supports audio files with good sound quality	F	M
UR_3.1	HLUR 2, HLUR 3, HLUR 5, HLUR 12	As an artist I want	To be able to geo locate and track human, sound and object movement	F	M
UR_4	HLUR 1, HLUR 4, HLUR 6	As an artist I want	To be able Perform spectral-timbral analysis of sound files	F	M
UR_5	HLUR 3, HLUR 4	As an artist I want	To synchronise movement and physiological data with the playback of sound files	F	S
UR_6.1	HLUR 1, HLUR 8	As an artist I want	To isolate the frequency range in which urban settings, speech, stadium crowds, underwater and car sounds occur	F	S
UR_7.1	HLUR 6, HLUR 11	As an artist I want	To be able to generate music, voice clones, musical compositions, visual, spatial	F	S

			sound and haptics		
UR_8	HLUR 2, HLUR 3, HLUR 7	As an artist I want	To have real-time analysis of full-body expressive movement	F	S
UR_9	HLUR 3	As an artist I want	To measure parameters of breathing / heart rate, electrodermal activity	F	M
UR_10	HLUR 4	As an artist I want	To collect and analyse comments on popular urban music videos	F	C
UR_11.1	HLUR 6	As an artist I want	To use audio data to Audio to Image & Image to Audio software to visualise sounds captured in public spaces, in space observatories, stadium matches, cars, events, people, etc	F	S
UR_12	HLUR 6, HLUR 9	As an artist I want	To collect data with body wearable sensors and biometric recording technology	F	S
UR_13	HLUR 2, HLUR 5	As an artist I want	To use computer vision to track eye movements, pupil responses, and blink rate in real time	F	M
UR_14.1	HLUR 3, HLUR 4 HLUR 6	As an artist I want	To collect and analyse data related to the psychological and emotional states of subjects in indoor and outdoor environments	F	M
UR_15	HLUR 7	As an artist I want	To have a Web-based system providing real-time Multilingual Natural Language Generation for Real-time and Mobile Feedback from users	F	M
UR_16.1	HLUR 2,	As an artist	To have a system to be able	F	S

	HLUR 7	I want	to record, in several environments such as urban spaces, stadium matches, underwater, and analyse sound files		
UR_17	HLUR 3, HLUR 4	As an artist I want	To trigger signals of movement in public space	N-F	C
UR_18	HLUR 5	As an artist I want	To utilise spatial sound technologies in AR, VR environments	F	S
UR_19	HLUR 2, HLUR 7	As an artist I want	To utilise multilingual technologies, such as concept extraction, sentiment analysis and text generation to analyse the comments of the participants during and after the experience	F	M
UR_20	HLUR 4, HLUR 6	As an artist I want	To have technologies that support the detection of unforeseen sonic emerging patterns of sounds	F	S
UR_21	HLUR 3, HLUR 5	As an artist I want	A system that can support parallel communication lines within many people.	F	S
UR_22	HLUR 13	As an artist I want	To navigate groups of people based on sounds	N-F	C
UR_23	HLUR 3	As an artist I want	To be able to capture 3D audio from urban spaces	F	S
UR_24	HLUR 2, HLUR 7	As an artist I want	Web based Systems to help connecting Technologies with the API to Interfaces	F	S
UR_25	HLUR 6, HLUR 11	As an artist I want	Music generating AI to be controlled by a user-friendly web interface	F	S
UR_26	HLUR 6, HLUR 11	As an artist I want	Text to Image to generate music in the form of patterns or spectrograms	F	S

UR_27	HLUR 13	As an artist I want	Develop sound navigation systems for the visually impaired	F	S
UR_28	HLUR 3	As an artist I want	Collect colour data	F	M
UR_29	HLUR 4, HLUR 5	As an artist I want	To be able to associate colours with Sound	F	S
UR_30	HLUR 4	As an artist I want	Use mobile EEG in real to get real time data	F	S
UR_31	HLUR 2, HLUR 5	As an artist I want	Use Data streams to inform directly the sound synthesis	F	S
UR_32	HLUR 4, HLUR 6	As an artist I want	Create an algorithm that is capable of silencing specific sound frequencies while promoting others	F	S
UR_33	HLUR 3	As an artist I want	Use contact microphones to capture vibrations in the infrastructure	F	M
UR_34	HLUR 4	As an artist I want	To do MRI scans at the artist's reaction to sounds recorded from football crowd matches	F	M
UR_35	HLUR 2	As an artist I want	Connect with external data sources such as weather data to influence the paths and patterns of sound objects	F	S
UR_36	HLUR 5	As an artist I want	A system where sound is able to drive a video montage and image arrangement	F	C
UR_37	HLUR 6, HLUR 4	As an artist I want	Create sounds and vibrations in different forms and intensities	F	S

Table 2: Aggregated Artist/User requirements and prioritisation

5 OUTLINE OF THE EVALUATION METHODOLOGY

The user evaluation will be based on the user' feedback, that will experience the artistic installations or experiments. This section presents the initial user evaluation plan. More specifically, it presents the **artist** and their respective **project**, the **specific challenges** and the **participants** that will validate the core challenge interpretation through the artistic **medium**. Based on the experiences of this first evaluation, we will update the evaluation plan for the further evaluation rounds.

Artist and project	Specific Challenge	Participants	Medium
Brigitta Onna Kristina Muntendorf – Sound of Story	How will the audience be guided, behave and perceive AI-Voice Clones?	Exhibition visitors	The focus lies on assessing HABITAT's impact on audience guidance and behaviour within a technologically immersive environment. The evaluation aims to gain insights into the reception of AI voice clones and the integration of such advanced technologies into the artistic experience.
Wen Liu, Alexander Hackl – Uncanny Reverie	'Uncanny Reverie' seeks to communicate climate change implications effectively without overwhelming or alienating the audience.	Exhibition visitors	During the performance, aggregated interaction data will be collected in order to gather insights into the engagement of the audience. The artists are interested in evaluating the curve of engagement over the duration of the performance. The main questions hereby are to see the learning curve over the first interactions and if interest decreases over the duration of the performance. All collected data will be pseudonymised and communicated as such.
Kakhidze Alevtyna – Reds are always longer?	What is the relationship between colour and sound in different settings?	Exhibition visitors - public	The evaluation process will assess the impact of the project's outcomes, including the development of sound navigation systems for the visually impaired, the creation of innovative

Artist and project	Specific Challenge	Participants	Medium
			soundtracks based on colour data, and the engagement of local youth in data collection and collaborative workshops.
Lugh O'Neill - An Ephemeral Spatial Sound environment	How can concert participants experience sound and musical events in novel ways, and artists are able to create work and diffuse audio in unprecedented settings and formats?	Concert participants	Audience engagement, behaviour, and feedback will be the primary form of assessment and evaluation of the results. Another key evaluation will be to measure how successfully the project manages to create spaces that enable and foster artistic expression that escape confines of typical concert settings.
Abel Korinsky - Resonance	How to enhance pedestrian safety?	Exhibition visitors - public/pedestrians	The evaluation process will focus on the effectiveness of how to address, alert, and inform people in urban spaces. The sound system will provide personalised information as individuals approach obstacles or interact with others nearby.
Paul Hans Maximilian Louis - Biomimetic Network of Sound for Future Cities	How vehicles communicating with each other promote a healthier acoustic environment in cities?	Exhibition visitors	Prior to the inaugural installation, a test at a designated venue will be conducted as an experiment showcasing the soothing and health-promoting impact of its sound algorithm, validated through rigorous scientific methodologies in collaboration with MPIEA. Additionally, meticulous tracking of visitor engagement, solicitation of feedback, and analysis of social media interactions will serve as vital tools for

Artist and project	Specific Challenge	Participants	Medium
			assessing the exhibition's impact and reception.
Ari Benjamin Meyers-Social Soundscapes (The invisible Choir)	How can AI foster participatory composition between artists, the public, and machine intelligence, pushing the boundaries of what is possible in sound artistry.	Exhibition visitors - Public	The project aims to reach a broad audience, including museum visitors and smartphone users accessing outdoor installations through apps. Through post-experience questionnaires and technical assessments, the project will evaluate the success of its installations in fostering collaboration, increasing empathy, and delivering consistent and engaging experiences.
Steps and Marches - Home Field Advantage	What are the effects and societal implications of big football stadium events not only between the crowd and the stadium but also with its surrounding urban environment?	Exhibition visitors - Football game fans - Local community surrounding the stadium	Following the data collection phase, the project will undergo an evaluation process to assess its effectiveness and societal implications not only between the crowd and the stadium but also with its surrounding urban environment. Analysis of crowd patterns, emotional reactions in combination to their impact on architectural components and materials will offer valuable insights into urban soundscapes and human behaviour.
Guillem Serrahima - Ubiquitous Noise	How to address the challenge of an as-yet unregulated area - that of high levels of electromagnetic frequencies in our daily lives?	Exhibition visitors - Public - Astronomical observatory scientists	The project envisions to raise awareness about the necessity for regulating exposure to artificial electromagnetic noise pollution in both public and private spaces, the assessment and evaluation process will involve measuring the effectiveness of the project's efforts in

Artist and project	Specific Challenge	Participants	Medium
			igniting tangible change. Furthermore, it will explore whether individuals reproducing such sounds also experience suffering.
Lea Luka Tiziana Sikau - The gut rehearses to tell you something	How to create a 'safer space' in which to attune to one's body on their own terms?	Exhibition visitors	The artist has conducted several exploratory studies to assess how individuals respond to gut sounds and bodily sensations. Through surveys, it was found that a significant portion of participants noticed their gastric signals after listening to gut sounds for a brief period. Additionally, emotions such as shame, disorientation, and comfort were commonly associated with gut sounds, highlighting the complex interplay between bodily sensations and emotional responses. These findings will inform the ongoing development and assessment of the project and its potential impact on audience perceptions and attitudes towards bodily experiences.

Table 3: Evaluation plan for art driven modules

6 CONCLUSIONS

The deliverable summarises the PUCs that have been designed to foster artistic interpretation of social challenges. The PUCs main challenges are briefly described and elaborated from the artistic visions, prototypes, and stories in detail, along with various scenarios inside each PUC from all the artists from the second Open call. The deliverable also describes the user requirements based on all the artists of the second open call for all PUCs and updated existing artist requirements from the first round of requirements. Finally, the deliverable describes an evaluation framework that will be used to assess the artistic interpretation of the four main ReSilence challenges.

The user requirements in this deliverable will drive the specification of the second set of functionalities required for the realisation of the artistic project by the artists from the second Open call and will drive the development of the technologies of ReSilence. The use case scenarios and the user requirements will be further elaborated and extended with addition of requirements from artists from both Open Calls as their projects progress in the subsequent version of the deliverable (D6.3).

7 APPENDIX

User Requirements questionnaire

ReSilence User requirements

This form includes questions that concern the elecitation of the first user requirements of the ReSilence project

1. Διεύθυνση ηλεκτρονικού ταχυδρομείου *

ReSilence Overview

The main objective of the ReSilence project is to support the development of art-driven technologies for designing the soundscape of future cities through the collaboration of artists, architects, urban designers, scientists, engineers and researchers.
ReSilence organizes its activities around four pilot use cases,

1. musical experience design centered on the active participation of citizens in music creation
2. the new silence of mobility
3. the acoustic perception of outdoor urban soundscapes
4. enhanced experiences for people with hearing and vision impairments.

ReSilence aims at promoting social inclusiveness at all groups. Moreover, the project contributes to the 2030 Agenda, Sustainable Development Goal, "make cities and human settlements inclusive, safe, resilient and sustainable. Moreover ReSilence will enrich the New European Bauhaus which aims at facilitating and steering the transformation of our societies through

1. regaining a sense of belonging,
2. prioritizing the places and people that need it most and
3. valorising diversity to securing accessibility and affordability.

ReSilence will use new technologies (AI & XR) to 1) explore the borders between noise and music in a changing world by producing an acoustic awareness in urban spaces (not only reducing the intensity of noise, but also considering it as an energy producer and designing positive sounds, sounds we want to preserve and multiply), 2) create new types of sonic urban experiences that expand possibilities for accessibility, active participation/engagement, sustainability, and social inclusion, and 3) involve and collaborate with artists in order to leverage multiple sources of inspiration, interdisciplinary collaboration, and build trust around AI & XR technologies.

General respondent information

2. Age group

Να επισημαίνεται μόνο μία έλλειψη.

- ◯ 18-30
- ◯ 30-40
- ◯ 40-50
- ◯ 50+

3. Gender

Να επισημαίνεται μόνο μία έλλειψη.

- ◯ Male
- ◯ Female
- ◯ Άλλο: _____

4. Profession/Education

_____

5. I agree that my responses to this questionnaire will be used for the elicitation and refinement of the user requirements of the ReSilence project. My contact details will only be stored so that I can receive information about the project's progress.

Να επισημαίνεται μόνο μία έλλειψη.

- ◯ Yes
- ◯ No

General questions related to ReSilence

Can be responded by all

6. In what terms do you consider sound pollution affects your daily life?

_____

7. How do you think your artistic intervention/tech prototype can have possitive impact on societal and/or environmental concerns?

_____
_____
_____
_____
_____

8. ReSilence aims to address challenges related to societal problems such as **social inclusion**, **sustainability** and **resilience** of European cities, through art-inspired technologies. What challenges will your project address and in what means

_____
_____
_____
_____
_____

9. How do you think your project can help build trust in new technologies by the public?

_____
_____
_____
_____
_____

Pilot use case specific related questions

Please respond only to the sections that concern the use case you are involved in

10. PUC1 - How could an artistic intervention/tech prototype bring new ways of enabling participation in concerts – on site and remote.

11. PUC1 - How does your project offer a unique and transformative musical experience? Explain the innovative elements or technologies employed in your work that redefine the boundaries of music and engage audiences in a sonic exploration.

12. PUC1 - How does the musical experience you provide through your project highlight and interact with the sense of memory and time, creating a novel reflection and renewal of personal and collective memories?

13. PUC2 - How could an artistic intervention/tech prototype improve issues related to sound and mobility?

14. PUC2 - How can sound designers incorporate user preferences and safety considerations when designing auditory landscapes for electric cars, ensuring a balance between functionality and the overall driving experience?

15. PUC2 - In what ways can collaborative efforts between sound designers, engineers and user experience experts contribute to creating personalized and immersive sound environments in electric cars that enhance the driving journey for individuals with diverse preferences and needs?

16. PUC3 - How could an artistic intervention/tech prototype adress issues of sound in cities?

17. PUC3 - How do you envision your artistic project contributing to the exploration and understanding of the sonic environment in urban spaces, and how do you plan to involve the local community in this exploration?

18. PUC3 - Considering the interdisciplinary nature of ReSilence, how do you plan to incorporate scientific research and technological advancements in your artistic project to create sonic experiences that address the challenges of urban soundscapes and contribute to their regeneration?

19. PUC4 - How do you think an artistic intervention/tech prototype can promote social inclusion?

20. PUC4 - How will your project contribute to creating inclusive and accessible experiences for individuals with different abilities?

21. PUC4 - How does your project aim to engage and evoke emotional responses from the audience?

ReSilence technologies related questions

Can be responded by all

22. ReSilence offers a variety of technologies, which ones will you use in your project and in what means? (Multilingual Natural Language Generation, Multilingual Language Analysis Pipeline,Interactive Sonification of Human Movement Qualities,Real-time Automated Analysis of Joint Action,Real-time Analysis of Full-body Expressive Movement, Web-based Systems for Real-time and Mobile Feedback,Tactile Sound,Audio to Image & Image to Audio)

23. What is the expected output from the technologies you will use and how will it be utilised in your project?

24. Will you perform any data collection and if yes, where and what type of data you'll need to collect?

25. How could existing, in the project, technologies be adapted to better fit your needs?

26. What technology, not present in ReSilence, do you think could be used in your project and why?

27. What technology, utilised in your project, do you consider innovative and why?

28. Please specify any additional requirements (if necessary)