S+T+ARTS

ReSilence

Retune the Soundscape of future cities through art and science collaboration.

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D6.1

Pilot use cases and initial requirements and challenges

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Abstract
This deliverable describes the initial outline of the projects of the artists in S+T+ARTS residencies 'that have formulated the pilot cases, as well as the requirements regarding each

pilot. It also includes a short outline of the requirements evaluation/prioritisation methodology.

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Executive Summary

This deliverable reports on the initial 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 PUCs. 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.

Then, the deliverable elaborates on the methodology adopted in order to define the user requirements derived by the PUCs as defined by each artist per use case, which mainly relies on the **MoSCoW** framework. This framework defines the elicitation and prioritisation techniques that are used to gather and rank the user requirements based on their importance towards the implementation of PUCs and more generally towards the deployment of a robust system.

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, 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 evaluate their artistic interpretations for each challenge.

Abbreviations and Acronyms

AR	Augmented Reality
DoA	Description of Action
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. In Section 2, the deliverable presents the pilot use case creation methodology as well as the prioritisation methodology. In section 3, it presents the updated core challenges as they have now been formulated by the artist's need for the realisation of each artistic project. In section 4, the high-level user requirements are analysed and presented, along with the aggregated final user requirements across all challenges. Lastly, section 5 presents a brief outline 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 already defined in the proposal preparation phase, are extended, and refined in this deliverable to construct realistic and meaningful use case scenarios by 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 explores how new digital technologies can redefine conventional roles in music and performance. Integrating audience interactivity and leveraging emerging technologies, artists have been invited to disrupt the dynamics of musical experiences. They should aim to seek to create innovative music performances, dance shows and participatory spaces that break free from traditional constraints. Collaboration between artists, technologists, scientists, architects, and designers is crucial in order to bring to life innovative artistic expressions. Through this quest, the goal is to reimagine the relationship between performers, audiences, and their surroundings, offering fresh perspectives in both physical and virtual realms. Related to this is the idea that a creative and aesthetically satisfying use of AI and XR technologies will positively affect people’s general views of these technologies.

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

The rise of the industrial revolution ushered in a new era of machinery, marking a kinetic revolution, characterised by the movement of mechanics. In this transformative landscape, sound design emerges as a user-focused experience, where utilitarian sounds can evolve into sources of artistic innovation. Electric cars, for instance, offer an unexplored territory for composers to craft unheard auditory landscapes, while also presenting an opportunity for the vehicle itself to become a dynamic performance art installation, where the driver takes on the roles of composer and performer. Moreover, the reflective properties of surfaces play a significant role in reimagining urban spaces and determine the choice of construction materials. Architects and artists explore the domain of indoor acoustic design, investigating the resonance of sound and the way our bodies engage with space, resulting in the creation of distinct sounds. Expanding on this knowledge, it is essential to apply it to public spaces like restaurants, subway stations and train stations, treating them as musical instruments that can be enhanced through intentional design interventions. The sound absorption and reflection qualities in these environments will shape the total impact for individuals.

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

Noise pollution presents a significant issue in urban areas, and consequently, incorporating soundscape design into city planning has gained attention in recent years. However, there is still a need for effective methods to shape the soundscapes of spaces, ensuring the well-being of the public. The core challenge is to develop tools and techniques that enable architects and urban designers to address noise pollution, with an emphasis on revolutionary ideas from sound artists. This process will involve simulations and prototypes implemented in smaller sections of the urban environment, initially involving a limited number of individuals, and gradually expanding to larger areas of cities and communities.

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

This use case emphasises the transformative power of vibration and tactile sensation in redefining our perception of sound and visual inputs. It highlights two key aspects:

a) The significance of a holistic approach to music and sound, involving the entire body rather than just the ears.

b) The conversion of physical objects into captivating soundscapes and vibrations, drawing inspiration from artists like Christine Sun Kim.

With specific attention directed towards individuals with hearing or visual impairments, the purpose of this exploration is to bring about a technological revolution by acting as a catalyst for enhancing our sensory capabilities. By bypassing the impaired areas (eyes, ears), we can redirect and distribute sound and visual information through alternative ways, enabling a more comprehensive and immersive spatial experience.

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". 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. A detailed exchange of ideas and expertise of ReSilence partners of the initial general topics of the proposed PUCs has been performed, before coming to conclusion about the selected cases. Eventually, partners have agreed upon one scenario for each of the 4 PUCs. After the first open call, the consortium conducted webinars and physical meetings with the artists during the first plenary meeting in Genoa in M11.

2.2 Methodology for Art Driven Experiments

According to the S+T+ARTS toolkit, the concept of Art Driven Technology concerns the evaluation of technologies based on their capabilities and places a strong emphasis on proactively identifying and resolving unintended consequences as novel challenges. In the case of ReSilence, the project will investigate the perception of sound in a dynamic reality.

ReSilence aims to explore art-driven technologies that influence the future soundscape of cities by bringing together a diverse group of actors, such as artists, architects, urban designers, scientists, and researchers. The project focuses on utilising AI and XR tools to address challenges within the Urbanism/Mobility sector. The objective is to explore the boundaries between music and noise and to evaluate user experience within different sound environments.

Artists are playing a role in the design and testing of technologies by enabling experimentation within the context of art. Building on this, artists' involvement in art-driven experiments will serve as a catalyst for innovation in both the artistic and technological domains.

Through a *research-creation methodology*[1], artists' involvement in art-driven experiments brings a unique set of methodologies, perspectives, and sensitivities to the technology development process. This integration not only facilitates a deeper exploration of the potential and implications of new technologies but also fosters the creation of works that embody a blend of social value and technological innovation.

In the context of ReSilence, artists utilize technology as both a tool and a subject of investigation, pushing the boundaries for a better world. This approach allows for the development of alternative design methods and use scenarios that might not emerge within conventional research and development frameworks. By situating technology within artistic

[1] Research through artistic practice

practices, artists contribute to expanding the understanding of what technology can do, how it can be experienced and used for improving the way of living and being in the world.

The multidisciplinary dialogue between artists, technologists, scientists, and researchers enriches the ecosystem of innovation, ensuring that technological advancements are not only technically sound but also culturally informed and human-centric. Artists bring to the table a critical perspective on the social and ethical implications of technology, prompting a more holistic approach to system design and testing.

As we saw in "D2.1 Design needs and challenges in orchestrating the future sounds and experiences of cities" in the first stage of our methodology we find the *vision* phase which puts emphasis on formulating a *research question* or creative inquiry. In this context, the vision involves identifying specific societal, cultural, or technological challenges that the project aims to address. Artists and researchers collaborate to articulate these challenges not only from a problem-solving perspective but also as opportunities for creative exploration and expression. This vision sets the stage for a project that is both innovative and reflective, aiming to contribute to knowledge and practice.

The *experiment/development* phase, which focuses on establishing the collaborations between artists and technology experts and setting up the specific ***requirements***, is a method for integrating *theory and practice*. Here, the "how" question explores the methodologies, artistic practices, and technological tools that can be employed to address the identified challenges. This stage involves iterative processes where artistic and technological experiments inform one another, fostering a creative dialogue that refines the project's direction.

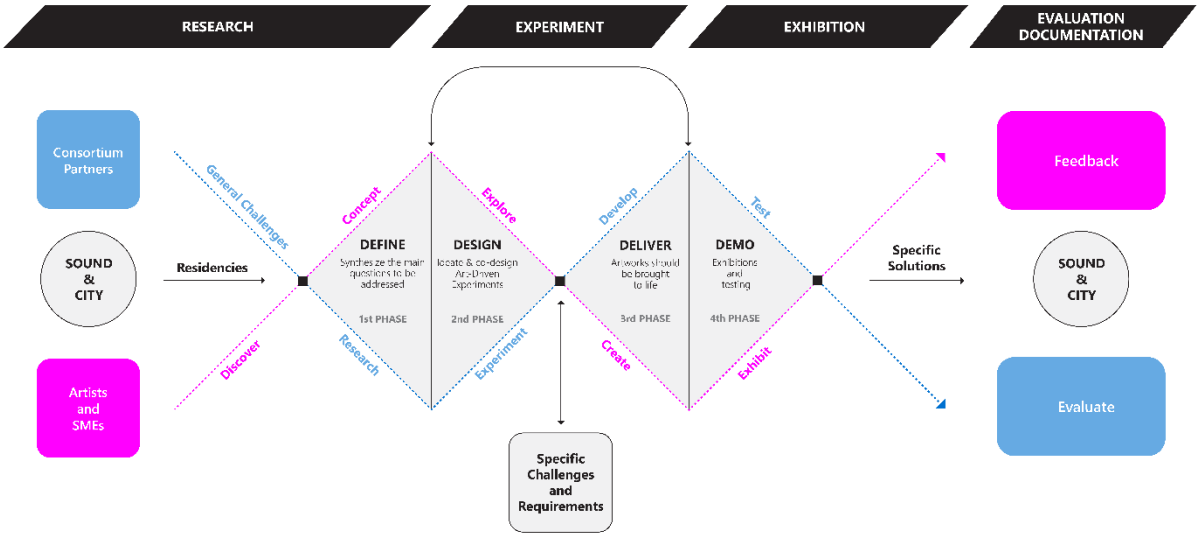

Figure 1: ReSilence_Art-driven methodology

After that, "*prototypes*" are developed as tangible expressions of the project's vision, grounded in the requirements and insights gained from the previous phase. This hands-on approach enables the direct engagement with materials, technologies, and artistic practices, allowing for a deep exploration of the possibilities and limitations of the envisioned solutions.

Prototyping serves as a bridge between conceptual ideas and practical applications, embodying the iterative process of creating, testing, and refining.

The final phase, the showcasing of outcomes (artifact/performance/event/demo/….), through *exhibitions* or other settings is a crucial element of research-creation, emphasizing the dissemination and reflection aspects of the ReSilence project. Presenting the outcomes in exhibitions provides a public platform for engaging with a broader audience, inviting feedback, and sparking dialogue.

2.3 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.

a. Collection of user requirements from the analysis of the ReSilence PUC scenarios as defined by Artists.

b. Collection of user requirements through structured questionnaires and discussions with Artists.

c. Aggregation of requirements from (a) and (b)

d. Prioritisation of requirements

User requirements are hierarchised as high-level user requirements (HLUR) and refined user required (UR). HLURs are placed one level up in the hierarchy and include abstract notions of user needs that might include sets and combinations of UR. UR is the lower-level form of HLUR that will drive the actual development of the ReSilence components. Usually a HLUR relates/consists of one or more UR.

The first step (a) of the adopted user requirements' elicitation methodology is to extract user requirements from the PUC scenarios as defined by each artist. More specifically, consortium partners engaged in several discussions and meetings with the artists to conclude with a set of requirements which are directly related to the drafted PUC challenges.

Thereafter, the second step (b) of the elicitation methodology is to extract user requirements by structured questionnaires distributed to artists to give their feedback with the aid of questionnaires and discussions.

In the case of ReSilence the stages a) and b) align since each PUC is being formulated by each artist, and the questionnaires offered more detailed insights on the actual implementation of each artistic interpretation. Once the first two parallel steps are completed, a set of user requirements was identified. The third step lists the HLUR that are the high-level interpretation of each UR with common UR across different PUCs and artistic needs producing the final list of HLUR (section 4).

In the final step (d), the final list of UR is merged when common needs across all PUCs occur. Each UR is analysed according to the following properties:

- Associated HLUR(s): This column contains the HLUR(s) associated with the specific user requirement.

- Detailed description: This column provides a detailed description of the specific user requirement.
- Functional or Non-functional: This column is used to identify whether a user requirement is functional or non-functional.
- Priority based on MoSCoW framework: The column is used to assign the priority of the user requirements according to the MoSCoW framework which provides four options of “Mo”,”S”,”Co”,”W” standing for “Must have”, “Should have”, “Could have”, “Won’t have”, respectively.

2.3.1 The MoSCoW framework

This step involves a prioritisation exercise following the MosCoW Framework, which was proposed by Dai Chegg as part of Dynamic Systems Development Method[2]. The MosCoW Framework assumes that all requirements are considered important, but the prioritisation method is used to establish delivery timelines of the requirements with regards to the business benefits and needs. More specifically, it considers the following categories:

- **Must Have:** Requirements labelled as ‘must haves’ have the highest priority in the development and delivery timeline. These are the requirements without which the program would not make sense form a business perspective and the project delivery is considered not successful.
- **Should Have:** Requirements labelled as ‘should haves’ are quite important but not considered as necessary as the ‘Must have’. They are less time-critical and often have alternatives to fulfil their purpose in the program.
- **Could have:** Requirements with ‘could have’ label are mostly requirements which are desirable but not necessary. These requirements are considered to be developed in case of extra resources.
- **Won’t Have:** Requirements labelled as ‘won’t have’ are the ones agreed by the stakeholders as least desirable and have the lowest priority and are usually not planned in the development plans.

The MoSCoW prioritisation technique helps the team to rank and classify items in order to get a successful product. The key benefits are:

- It is based on experts’ opinions.
- It is quick and easy to complete.
- It is good in defining the priorities of projects that are in progress.

Although being a great technique for elicitation and prioritisation of requirements, the key assumptions and the weakest points are:

- MoSCoW rules can be subjective. If there is no effective cooperation, this prioritisation method may be inaccurate.

[2] https://en.wikipedia.org/wiki/Dynamic_systems_development_method

- The technique requires the team to have good familiarity with the product features. When the participants have different levels of familiarity with the product, it is difficult for them to classify or rank the items. In this case, the expert conclusions will be unhelpful.

Since ReSilence has partners with specific expertise in their domain the above-mentioned weak points are handled quite easily.

Therefore, we used the MoSCoW framework to define the user requirements that will drive the development plan of the technologies and functionalities, developed within ReSilence, expected by the artists. Although the plan will use these user requirements as the basis of the development, regular feedback loops with the users will be applied to test and verify the methodology along with an updated user requirement document during the project lifespan.

2.3.2 Short review of different user requirements extraction methodologies

There are several user requirements extraction methodologies. Some of them are listed below:

- **MoSCoW Framework:** The MoSCoW framework is essentially a prioritisation method used for software development in Agile environments[3]. The framework allows the stakeholders and the developers to come to a common understanding regarding the priority to a particular requirement.
- **Equity Model:** In this methodology, the prioritisation of the gathered requirement is based on fairness. This is usually done based on the budget that can be allocated inside an organisation on the development of a particular component and priority is given to it.
- **Classes of Service:** This model is the easiest method to implement in various projects, the simple idea is to ensure that whoever makes a request for the requirement also takes responsibility for the pressure they put in the development process. This method is not effective in collaboration development and projects with multiple partners involved.
- **Weighted Look Ahead Approach (WLAA):** This approach considers the development process as a Net Present Value (NPV) generated by a sequence of Minimal Marketable Features (MMFs). One system can have multiple components coming in to form an MMF. Since MMFs are interdependent on each other in most software, the idea of WLAA is not recommended where all components need to be developed for the system to work in perfect synchronicity.

After analysing all the aforementioned methodologies and other methodologies[4], and more specifically taking into account that ReSilence is a multidimensional project, with a great deal of partners of different business background (MSEs, architecture offices, SW companies, research institutes), but with a common goal to support the artistic interpretations the consortium agreed to continue with the MoSCoW framework for the requirement gathering and prioritisation.

[3] https://www.agilealliance.org/agile101/

[4] https://labs.openviewpartners.com/prioritization-methods-for-developers/

2.3.3 Functional and Non-Functional requirements

To start defining the requirements, it is quite important to know which requirement is classified as a functional requirement and which as non-functional requirement.

Functional requirements can be calculations, technical details, data manipulation and processing of specific functionality that define what a system is supposed to accomplish. These are the requirements and functionalities that a PUC is supposed to test and evaluate.

Non-Functional requirements specify the criteria that can be used to judge the system. They provide input on how the user wishes the system to perform during the tasks. Other terms for non-functional requirements can be “qualities”, ”quality goals”, ”constraints” or ”quality of service” of the platform.

2.3.4 User requirements extraction in ReSilence

A structured questionnaire was distributed to all the Open Call artists, including general questions related to the project as well as PUC specific questions aiming to extract specific requirements for the realisation of each artist’s or team's project. Appendix

Based on the PUCs, initial requirements were defined, which were subsequently analysed into more detailed user requirements as elaborated by the artist's specific implementation needs.

3 RESILENCE CHALLENGES

This section elaborates on the four main challenges (PUCs) and the associated user requirements, which were defined by the artists, so far from the first open call, and have been extended during the 1st artists webinar, physical and online meetings as well as the 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 help us identify the needs of the artists to realise their artistic proposal and evaluate the system performance and capability.

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 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.

3.1 Musical Experience Design

3.1.1 Theatre of Memory/ Tim Otto Roth

The **challenge** is to communicate in an intuitive way neuronal feedback, which constitutes on a cellular level all our cognitive processes. Most people do know feedback in acoustic systems as a cascading effect of a microphone in combination with a loudspeaker as explored artistically by Jimmy Hendrix with his guitar. The *Sonapticon* uses a similar but different scheme. The basic unit of the Sonapticon are audio neurons interconnected not by wires but by sound transmitted in space. An audio neuron registers impulses spikes) from its acoustic environment by a microphone and fires its own impulse by a loudspeaker. The clue of that system is that every neuron gets assigned a sine tone with an individual frequency.

Prototype

Theatre of Memory: The Sonapticon was realised for the first time in 2012 as a large-scale studio version with 43 speakers at the ZKM Karlsruhe. The most recent version under the ReSilence residency makes the whole system mobile, flexible, and even more immersive creating custom made audio-neuron sculptures distributed over the whole space. Here, the imachination labs enhanced the loudspeaker sculptures, which were already successfully used for the sound installation emitting tones in 360 degrees. The electronics are extended by two special microphones, so the speakers can record sound in real time triggering the neuron

model running autonomously on the speakers' microprocessors. Above all, the colour illumination indicates the type of neuron and the current state of excitation.

Artist Story

Comprehending the complexity of neuronal feedback helps to get a *general understanding how complex non-linear systems work* underlying so many natural but also social processes. The Theatre of Memory establishes a new paradigm of sound as an acoustic network interconnecting tones in space. The electronics developed allow for a lightweight and energy efficient implementation of light and acoustic components, so that the interactive speakers can be freely arranged in the room. As the name says the Theatre of Memory echoes memory function as we can find in biological neuronal networks.

3.1.1.1 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	Aesthetic evaluation of music, perception, and experience.
UR_1.2	Scientific methods to explain the psychological, neuronal and socio-cultural basis of aesthetic perceptions of sound
UR_1.3	Web-based Systems including Multilingual Natural Language Generation for the assessment of user surveys

3.2 The New Silence (Sound and Mobility)

3.2.1 Artistic vision

For this core challenge the first Open Call for artists did not consider any artist proposal suitable for this challenge. However, this challenge is led by consortium partner and Artist Maurice Benayoun who is very experienced on the subject and so far, assisted on the elicitation of some requirements based on the PUC's needs. Nevertheless, the second Open Call will introduce artists for this use case and will enrich and elaborate on the requirements specifically tailored for the artists's needs. Based on the core challenges as elaborated in D2.1 research and development on this PUC focuses on creating advanced sound systems that pursue dynamic sound generation based on driving conditions and user preferences. Architectural interventions in urban environments can enable the interaction between electric cars and the surrounding acoustic environment, and artistic solutions can be proposed to mitigate noise pollution and enhance the urban sonic experience.

Prototype

There is no specific prototype planned for this use case yet since there are no open call artists selected for this use case. Nevertheless, from this PUCs initial elaboration as presented in D2.1 ReSilence Design needs, suggests that a potential artwork or prototype from that core challenge could be a sound installation that simulates the sonic experience of driving an

electric car both internally and externally. A possible installation would allow visitors to navigate through different auditory landscapes, showcasing the creative possibilities in sound design for electric vehicles while also incorporating elements of urban design, demonstrating how sound interventions can transform public spaces into engaging environments.

Artist Story

There is no specific artist story yet since there are no open call artists selected for this use case. However, all artist developed projects will be evaluated by the end user that will experience the artistic installations/interpretations.

3.2.1.1 User requirements

The user requirements elicited for this PUC are only derived from the PUC analysis and the input by Artist and consortium partner Maurice Benayoun. We envision ReSilence components that provide the following functionalities:

User Requirement	Description of Action (DoA)
UR_2.1	Isolation of the frequency range in which car related sounds occur
UR_2.2	Use Audio to Image & Image to Audio for the visualisation of car sound recordings
UR_2.3	Sonification of Human Movement both internally and externally of cars, synchronised with car sounds

3.3 Sound of Urban Spaces

3.3.1 Moving soundscapes/Andrea Cera

The main **challenge** is to investigate if the intrusiveness of sound stimuli during the performance of the task provokes changes of (individual as well as group) movement qualities and physiological signals in subjects performing the task, while immersed in a given auditory background from which intrusive sounds emerge. In particular we want to investigate disruptions in joint activity coordination symmetry, balance, etc. In this case, working on intrusiveness of man-made sounds will not only open a possibility to create counterstrategies to improve the sonic qualities of everyday life in a broader view but it should increase awareness of individual responsibilities in the degradation of our soundscape. The non-human quality of polluted soundscape has a very human origin, the individual blindness (or deafness) to the existence of other sentient people around us, whose auditory systems cannot defend themselves from noisy emissions. This goes for cars and motorcycles, but also for smartphones, portable musical devices and so on. The emphasis is aimed at observing the influence of intrusive sounds on body movements. The innovative side of this project lies in the relation between sound intrusiveness, as related to urban soundscapes, but also as a morphological feature along qualities of movement.

Prototype

As a result of the residency, an interactive installation is being developed. This installation will feature portable micro-installations and software modules that can be experienced individually or in various settings. It will provide opportunities for participants to engage with the soundscape and analyse countermeasures to intrusiveness. The objective is to create a collection of modules that can be used in different situations, such as walks in noisy streets, home environments, conferences, or educational workshops. This work aims to prove that intrusiveness has consequences in movement quality, and that prototypes of countermeasure that will be developed will help reduce sound intrusiveness in an efficient way.

Artist Story

Several experiments will assist in exploring the relations between intrusive soundscapes and quality of movement. The space of the experiments, the control of light, important elements that affect the assessing the annoyance of a sound, as well as the positions of loudspeakers will be blueprints for the design of the installation. The differences between the experiments and the installation will be in terms of sonic scale and interaction. In the installation participants will feel their own rigidity, lack of grace as gigantic sonic aggressions, and their fluidity and cohesion with others as sudden, peaceful moments of quasi-silence. Additionally, this project will be presented in schools; workshops/demos for designers, architects, digital creators - but also for dancers, yoga, and meditation schools; web dissemination; as an app. All play an important part of the dissemination strategy, mainly to diffuse a new way of thinking about the responsibility which comes with the creation of sound, be it the acceleration of a car at night in a residential area, or the choice of a particular ringtone when travelling on a train.

3.3.1.1 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	Sound files used for experiments to have good sound quality
UR_3.2	Sound files used for experiments to have a duration of at least 2/3 minutes
UR_3.3	Real -time Interactive Sonification of Human Movement Qualities, as measuring means of the efficacy of the sound design prototypes
UR_3.4	Real-time Automated Analysis of Joint Action and Full-body Expressive Movement as measuring means of the efficacy of the sound design prototypes
UR_3.5	To be able to measure breathing / heart rate, electrodermal activity
UR_3.6	Spectral - timbral analysis of sound files both recorded (raw) and manipulated

UR_3.7	To record movement and physiological data, as synchronised sequences with the playback of several sound files
UR_3.8	To be able to record subtle movements and changes of balance, with the least equipment possible to allow free movement
UR_3.9	To be able to analyse subtle movements and changes of balance, using minimally invasive technologies, to allow for a natural expression of movements

3.3.2 Sonic Drift CDA/Caroline Claus

In the context of transformational urban regeneration much emphasis is being placed on the 'efficacy' of a plan or design project, or the capacity of regeneration projects that contribute to environmental improvement, new social opportunities, economic innovation, and larger cultural effects. Confronted with the effects of climate change, the presence of contemporary urban violence and the gradual implementation of urban planning projects in the public space of Brussels North, the home area of the artist Carolina Claus, a sonogeographic dérivé is proposed as an artistic experiment in the cartographic valorisation of urban sonic space shifts both as materiality and physical form and in sonic experience. Instead of seeking for acoustic comfort, sonic space shifts are investigated as elements that affect bodies and makes them shiver, sweat, to turn away, to pause or linger, to feel uncomfortable or alienated.

This sonogeographical dérivé will be handled as a planning and design research that seeks to understand how aesthetic considerations of non-anthropocentric dynamics of inclusion and exclusion can lead to the definition of sonic (infra-)structures for ecological and social symbiosis. Through sonic-material analysis, it will attempt to uncover the contingent and situated performance of a site's urban sound space via research into the expression of its affective sound spheres.

From a situated engagement with the sonic materiality of three selected urban spaces, the project will zoom in on the material (infra)structuring of affective vibrations that induce dis/comfort and dynamics of in/exclusion when traversing the urban landscape of Brussels CDA. In tracing the affective sound spheres, the focus of my sonic cartography shifts from mapping discrete locations and zones in a topography to the survey of dynamic topologies. By situating this sonogeographical dérivé in planning and design research, it interrogates how an aesthetic consideration of non-anthropocentric dynamics of inclusion and exclusion can lead to the definition of sonic (infra-)structures for ecological and social symbiosis. The project aims to articulate the potential of a situated engagement for integrating socio-ecological performance and awareness of the ecological and social value of urban sound and vibration in planning and design research and dynamics of social participation. Therefore, the experiment is framed within a landscape approach to public and green space development, with the intention of pointing out the importance of accounting more deeply for effective processes in the making of future public urban space. For the residency it focuses on the sound spaces of a selection of three urban spaces.

Prototype

The artist aspires to develop a sonogeographical dérivé, which serves as an audio observatory and an audio paper. The format of the observatory will consist of several actions such as the collection of recordings for collective discussion on listening experiences, behaviours and attitudes and longer-term observation of sonic events and patterns. These actions will be coupled with the production, synthesis, mixing and sharing of recordings in a sonorous scale model. Both the observatory and audio paper are perceived as important tools for communication and involvement on both local and international level. Additionally, an AR/VR experience will be developed to present the sonorous scale model online, allowing users to submerge themselves in the transformed sonic environment. At the final stage, a book launch and a seminar on sonic urbanism will be organised, functioning as a platform to celebrate and disseminate the synthesised sonogeographical dérivé among the public.

An important objective of the project is to enrich connections and establish new links between inhabitants, artists, associations, urbanists and architects whose work and interests responds to sonic and affective environmental aesthetics in relation to regeneration of urban spaces. Three vibrant urban spaces capable of bringing together different communities, stakeholders and individuals as somehow spontaneous urban architectural settings will be selected. During the residency the artist will experiment with the technical and aesthetic possibilities as well as ethical challenges of audio logging as sound art. The combination of passive audio logging with audio synthesis in a compositional form as a sonorous scale model is of high interest in this project.

Artist Story

The techniques of passive audio logging and synthesis within the sonogeographical dérivé will prompt research questions and opportunities related to the expertise of some of the project partners. The idea is to combine field recordings with passive logging and to install enclosed sensor kits at several locations along Brussels. These recordings will be complemented by other data from recorders and sensors, such as temperature and relative humidity. The artist envisions to work with audio data & (acoustic) intelligence software for the detection of sonic events, patterns, and figures in public space and to link these technologies to Audio to Image & Image to Audio for the abstract visualisation of the recordings. To ensure privacy and compliance with relevant legislation, in collaboration with researchers from CERTH, the artist will work on robust methods to render out completely any unintelligible sounds that may incidentally be overheard by the sensors. An algorithm based on “sound shredding” which could affect the signal at all times, whether or not a voice is present could also be developed. This could also be installed on the audio moths or other passive recorders. Sonification of movement will be utilised by capturing walking sounds as performance in urban spaces as part of participatory workshop. Web-based Systems for Real-time and Mobile Feedback will be used for collective and individual listening sessions - discussion sound experiences and attitudes in relation to urban space evaluation. There will possibly be analysis of comments of popular urban music videos performed and filmed in the area.

3.3.2.1 User requirements

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

User Requirement	Description of Action (DoA)
UR_3.10	Use methods to render out completely unintelligible voices or conversations that may incidentally be overheard by sensors
UR_3.11	To isolate the frequency range in which speech sounds occur
UR_3.12	To record triggering signals of movement in public space
UR_3.13	To use Web-based Systems for Real-time and Mobile Feedback for collective and individual listening sessions
UR_3.14	To be able to analyse comments on popular urban music videos performed and filmed in the area of interest
UR_3.15	Use tools/services for the detection of sonic events, patterns, and figures in public spaces
UR_3.16	Link audio data to Audio to Image & Image to Audio software To be able to abstractly visualise the recordings of sonic events, patterns, figures in public space
UR_3.17	Use methods to render out completely unintelligible voices or conversations that may incidentally be overheard by sensors

3.3.3 Haptic ReSilence of the Wild Blue/ Gustavo Maggio, Wendy Chua, Joyce Beetuan Koh

This project aims to investigate the resilience of coastal cities and the environmental issues related to the water bodies that encircle urban land. The team is planning to develop a Mixed Reality experience that currently has two chapters. The first chapter will zero in on the sonic pollution of the sea through sonic blasts (military) and seismic surveys (deep sea mining) and how those affect sperm whales and beaked whales. The second chapter aims to “tangibilise” marine heatwaves that have plagued the Mediterranean coast and the harmful algal blooms that flourish as wildfires burn unseen beneath the waterline. In both scenarios, the team will be working with marine biologists to translate scientific sea data into sound and sensorial composition.

Prototype

The sounds from the sea in coastal cities are usually invisible, especially those under the water surface. Anthropogenic activities encroach on marine habitats at the edge of urban coastal cities. By translating scientific sea data (sonic activity or sea composition of algal blooms) into tangible, visceral and sonic experiences, the team to help participants make sense of coastal threats and understand the lives, more-than-human, and the soundscapes that exist below

the thin blue water line are no longer silenced. The result anticipated from this project is a multisensory installation that combines haptic soundscapes with Mixed Reality (MR) mediascapes. Participants will have the opportunity to wear sensory wearable suits and undergo haptic-sensory compositions inspired by the scrutiny of sound and the ocean. The haptic suit worn by the participant along with the VR lens will produce an embodied, sensorial experience. At the end of the Mixed Reality experience, the participants will be invited to pen words of reflection. Multilingual technologies, such as concept extraction, sentiment analysis and text generation, will be used in the final reflection component at the end of the experience for participants to produce a collective artwork of text for advocacy. VR is an existing technology but sound exploration within VR is still largely under-explored. By utilising spatial sound technologies and synchronising it with haptic outputs, the team will offer an experience more visceral and sensorial for the participant.

Artist Story

The team plans to leverage their extensive network of museums, galleries and performing theatres with whom they have previously collaborated. They plan to premiere the first installation in Europe, potentially in Berlin, and subsequently tour it in different cities. Drawing on their experience in curating immersive exhibitions, Gustavo, Wendy and Joyce are well-equipped to translate their work into tangible and interactive exhibition experiences for the public. With potential venue partners, such as the Red Dot Design Museums, the National Museum of Singapore, Esplanade theatres and the Humboldt Forum, they have a range of options to consider for staging their art piece. Additionally, being part of research clusters and networks like Matters of Activity and Game Lab Berlin provides them access to further exhibition opportunities and venues in Berlin, such as the Kunstgewerbemuseum and the Tieranatomisches Theater.

3.3.3.1 User requirements

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

User Requirement	Description of Action (DoA)
UR_3.18	To have a final reflection component that collects a few words from each participant (their post-experience reflection) to string into a collection of poems for advocacy
UR_3.19	To be able to "clean" sound files found on the web and on ocean science databases of whale songs, sonic blasts from ships, engine noise from boats, airgun sonic disturbances from seismic surveyors for specific sounds to be more perceptible
UR_3.20	To translate scientific sea data (sonic activity or sea composition of algal blooms) into tangible, visceral and sonic experiences
UR_3.21	To utilise spatial sound technologies in VR and synchronise them with haptic outputs

UR_3.22	To use multilingual technologies, such as concept extraction, sentiment analysis and text generation, to analyse the comments of the participants after the experience
UR_3.23	To detect of sonic emerging patterns of underwater sounds (recordings of whale songs, sonic blasts from ships, engine noise from boats, airgun sonic disturbances from seismic surveyors and algal blooms)
UR_3.24	To be able to collect sounds underwater

3.4 Full-Body Sound Experience

3.4.1 Soft/ Loukia Tsafoulia, Alfonso Severino

Project Soft addresses issues of safety, acceptance, and comfortability. Specifically, it investigates the challenges stressful sonic environments present to neurodivergent individuals and the healing and self-regulatory opportunities of sensory multimodal and responsive spaces. It explores technology and dynamic environments' role in resolving perceptual conflicts and redirecting implementation and evaluation methods. Using non-invasive technologies, the project examines how purposefully modifying sensory aspects of an interior environment— such as the effect of colour, light, and sound—can affect occupants' physiological and psychological states within a space. The project aims to establish a series of spatial parameters that serve as a scaffold and then customise based on the individual, with continuous, real-time adaptation occurring dynamically.

Soft aspires to offer a valuable awareness resource for sensory experiences and interactions within our built environments. The main goal is to examine how embodied and technologically mediated spaces can support social inclusion, mainly through sensory inclusion for perceptual and cognitive divergent individuals.

Prototype

The residency aims to achieve the desired outcome of creating a functional prototype for the "Soft" project. This prototype will be a deployable and adaptive therapeutic environment conceptualised as a spatial wearable. It will take the form of an encapsulated pod, where individuals can retreat to when overwhelmed or overstimulated. The prototype will incorporate various technologies and design elements to modify sensory aspects of the interior environment, with a particular emphasis on sound and light. It will utilise body-based biometrics and closed-loop biofeedback to intelligently modify the sonic and light characteristics in real-time. The purpose of these modifications is to create a soothing and calming environment that assists the occupants in self-regulating their emotional and physiological states. The design will cater to various contexts, such as sensory-loaded lobbies, concert halls, exhibition venues and hospitals. Through its deployment, the team intends to further examine the therapeutic benefits of the adaptive environment and its potential in fostering the well-being of individuals, both neurotypical and neurodivergent.

In this project community engagement and participation are crucial. Interactive, immersive, and thought-provoking public art can transform public spaces into inclusive gathering places

that foster community. A tech prototype/installation becomes a platform for people from various backgrounds to connect, share their experiences, and build connections. Tech prototypes at the intersection of art and science are, by nature, collaborative. These works promote empathy, shared values, and aspirations by bringing people with diverse perspectives together. Art therapy can provide a safe space for individuals to express themselves and develop a sense of empowerment. Combined with workshops and therapy sessions, installations and tech prototypes can contribute to individuals' emotional and mental well-being who may otherwise feel excluded.

Artist Story

“Soft” is set to undergo testing and evaluation at Thessaloniki Concert Hall. The preliminary idea will be presented at the UIA 2023 CPH World Congress and published under Springer's Sustainable Development Goals series. The outcomes of the residency will be shared through publications, conferences and events, including the Venice Biennale and Ars Electronica festival. The “Soft” prototype will be deployed at venues such as the MusiXLab space and Thessaloniki Concert Hall. Collaboration with neurodivergent communities, both in Europe and the US, is planned. Online platforms will be used for project updates and public engagement.

The project will develop technologies that adapt an encapsulated environment to the sensory needs of the individual that occupies it. The design of such a safe space is research-driven and addresses personalised sensory needs of neurodivergent individuals with proven benefits for the neurotypical. Within the project’s adaptive interior environment, sound experience occurs via a full-body approach. The project's occupants will be fully immersed in the space, which in turn, will respond to their emotional state in real-time. Unlike other notable work in this field, this project will seek to use distant-to-the-body technology to adapt in combination with the sonic and light characteristics of the environment in real-time in response to human movement, body-based biometrics, and other human body physiology and psychology states.

3.4.1.1 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 computer vision to track eye movements eye movements, pupil responses, and blink rates
UR_4.2	To connect real time feedback and inform the environment’s sonic and light response.
UR_4.3	Real-time Analysis of Full-body Expressive Movement: To record, track, and trace body movement (i.e., body rocking) that could serve in the analysis of emotional state and anxiety levels.

UR_4.4	To collect data related to the psychological and emotional states of the occupant
UR_4.5	Web-based Systems for Real-time and Mobile Feedback and Multilingual Natural Language Generation: To create a communication interface that facilitates feedback on the interactions between the occupant and the prototype space
UR_4.6	Body wearable sensors and biometric recording technologies can be adapted to the space created, allowing “non-invasive” experiences for the space occupants
UR_4.7	To externalise the physiological and psychological states of the user
UR_4.8	Real-time Automated Analysis of Joint Action

4 ANALYSIS OF RESILENCE REQUIREMENTS

The following table (Table 1: Analysis of the High-level user requirements) accumulates the user requirements that have been developed until now, based on user requirements presented so far per artist needs. The user requirements are taken from the use cases section (Section 3) and are grouped under High level user requirements (HLURs).

Final HLUR	Artist Requirements	Final HLUR Title	Final HLUR Description
HLUR 1	2.1, 3.6, 3.10,3.11 3.19	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	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	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	Multiple data and signal analysis	Artists can analyse data from online sources, physiological data as well as signals of movement
HLUR 5	2.3, 3.7, 3.21, 4.2,4.1	Data synchronisation	Artists can utilise synchronised sources of data inputs and outputs

HLUR 6	2.2, 3.17, 4.7, 3.20, 3.23	Data translation/visualisation	Artists can externalise/visualise capture sonic and physiological data
HLUR 7	1.3, 4.5, 3.22, 3.18	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	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

Table 1: Analysis of the High-level user requirements

In Table 2: Aggregated Artist/User requirements and prioritisation, 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 1. 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	HLUR 7, HLUR 10	As an artist I want	To assess the psychological, neuronal, and socio-cultural basis of aesthetic perceptions of music and sound	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	HLUR 2, HLUR 3, HLUR 5	As an artist I want	To be able to track human 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	HLUR 1, HLUR 8	As an artist I want	To isolate the frequency range in which speech, underwater and car sounds occur.	F	S
UR_7	HLUR 5	As an artist I want	To be able to generate visual, spatial sound, and haptics	F	S
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	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, 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	HLUR 3, HLUR 6	As an artist I want	To collect and analyse data related to the psychological and emotional states of the occupants	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	HLUR 2, HLUR 7	As an artist I want	To have a system to be able to record, in several environments such as urban spaces, underwater, and analyse sound files.	F	S
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 VR environments	F	S
UR_19	HLUR 2,	As an artist	To utilise multilingual	F	M

	HLUR 7	I want	technologies, such as concept extraction, sentiment analysis and text generation to analyse the comments of the participants after the experience		
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	C

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
Tim Otto Roth, Theatre of Memory	How to create an immersive sound environment that reflects memory processes, using neurobiological feedback?	Exhibition visitors	Theatre of Memory is an experimental environment with 40 audio neurons and most probably is the first survey of its kind exploring a sound installation. A visitor survey is currently developed to investigate the auditory and visual experience. The feedback from the users will be obtained with a questionnaire to be filled out after the experience of the installation by the users.
Andrea Cera, Moving Soundscapes	How to stimulate active participation to counteract the polluted city soundscape?	Experiment subjects	Several experiments will assist in exploring the relations between intrusive soundscapes and quality of movement. The space of the experiments, the control of light, important elements that affect the assessing the annoyance of a sound, as well as the positions of loudspeakers will be blueprints for the design of the installation. The differences between the experiments and the installation will be in terms of sonic scale and interaction.

Artist and project	Specific Challenge	Participants	Medium
Caroline Claus, Sonic Drift CDA	How are sonic affective flows entangled in shifting socio ecological material spaces?	Citizens and local stakeholders of Brussels Chaussée d'Anvers	The project aims to articulate the potential of a situated engagement for integrating socio-ecological performance and awareness of the ecological and social value of urban sound and vibration in planning and design research and dynamics of social participation. Therefore, the experiment is framed within a landscape approach to public and green space development, with the intention of pointing out the importance of accounting for effective processes in the making of future public urban space. For the residency it focuses on the sound spaces of a selection of three urban spaces.
Artist collective (Gustavo Maggio, Wendy Chua, Joyce Beetuan Koh), Haptic Resilence of the Wild blue	How to create inclusive artistic encounters, while addressing the ocean's soundscape disruption?	Exhibition visitors	The team plans to premiere the first installation in Europe, potentially in Berlin, and subsequently tour it in different cities. Drawing on their experience in curating immersive exhibitions, Gustavo, Wendy and Joyce are well-equipped to translate their work into tangible and interactive exhibition experiences for the public. With potential venue partners, such as the Red Dot Design Museums, the National Museum of Singapore, Esplanade theatres and the Humboldt Forum, they have a range of options to consider for

Artist and project	Specific Challenge	Participants	Medium
			staging their art piece. Additionally, being part of research clusters and networks like Matters of Activity and Game Lab Berlin provides them access to further exhibition opportunities and venues in Berlin, such as the Kunstgewerbemuseum and the Tieranatomisches Theater.
Loukia Tsafoulia, Alfonso Severino, SOFT	How to integrate distant-to-body tech, cater to neurodiverse needs and address physiological and psychological states?	Neurodivergent community	'Soft' is set to undergo testing and evaluation at Thessaloniki Concert Hall. The preliminary idea will be presented at the UIA 2023 CPH World Congress and published under Springer's Sustainable Development Goals series. The outcomes of the residency will be shared through publications, conferences, and events, including the Venice Biennale and Ars Electronica festival. The 'Soft' prototype will be deployed at venues such as the MusiXLab space and Thessaloniki Concert Hall. Collaboration with neurodivergent communities, both in Europe and the US, is planned. Online platforms will be used for project updates and public engagement.

Table 3: Evaluation plan for art driven modules

6 CONCLUSIONS

The deliverable summarises the initial 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. The deliverable also describes the initial user requirements based on all the artistic vision for all PUCs. Finally, the deliverable outlines an evaluation outline that will be used to evaluate the artistic interpretation of the four main ReSilence challenges.

The user requirements in the deliverable will drive the specification of the first set of functionalities needed in the for the realisation of the artistic project for the artists from the first 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 the Second open call in the subsequent versions of the deliverable (i.e., D6.2 and 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)